StarQuality

User Manual

Software Version: 3.5
January 2012
P/N 215989

Document History

Changed Item	Description	Date
This is the first release	Version 1.0	December 2008
General	Version 1.5 - Changed to reflect multiple server group sites. Added the following chapters: ■ Network Discovery ■ Setting Alarm Thresholds ■ Reports	February 2009
Introduction	Moved Counters for BreezeMAX from Introduction to Chapter 4 "Viewing Measurements"	
Installation	Added licence loading steps.	
Settings	Moved topics into relevant chapters.	
General	Added Solaris information Added 4Motion to the supported equipment	Ver.2.0 June 2009
Introduction	Data Structure - Hierarchy changed	
Installation	Added installation on Solaris Added upgrade for Windows installation	
Getting Started - Operations and Navigation in the Hierarchy	Hierarchy changed Activating SOAP server - new	
Viewing Measurements	Added 4Motion set of discovery measurements; screen captures changed	
Setting Alarm Thresholds	Added 4Motion information	
NBI	New Chapter	
Reports	Chapter modified	
Installation	Added Linux as an optional OS	
Measurements	Changed measurement definitions Added search feature for text including spaces Added Operations drop-down menu options	
General	Added BreezeACCESS VL support information	Ver.2.5 December 2009
Installation	Added Oracle patch installation	

Changed Item	Description	Date
Introduction	Added 4Motion ver.3.0 and BreezeMAX Extreme to the supported equipment list. Deleted Deployment Scenarios	Ver.3.0 June 2010
Installation	Revised structure	
Getting Started	"Operations and Navigation in the Hierarchy" on page 126 - Removed the Link option (for Alarms and Measurements)	
Network Discovery	Added 4Motion and BreezeMAX Extreme information. Modified Prerequisites Generally revised	
Reports	Added 4Motion and BreezeMAX Extreme information.	
Setting Alarm Thresholds	Moved all syntax tables to Chapter 11, Device Specific Information	
Chapter 11,Device Specific Information	New Chapter, including information per device type	
Chapter 5, Viewing Measurements	Reformatted **View** group options into tables and added description to the "Display Deleted" functionality.	Ver.3.0.15 September 2010
Chapter 5, Chart Settings	Mouse hover now displays firmware changes	Ver.3.1.10 March 2011
Chapter 9, Adding a New Server	Additional step for importing devices from AlvariSTAR	
4Motion	Restructured section to include version management and separate sub-sections for each supported version	
Deletion of multiple equipment	New section	
Managing Equipment with Unsuccessful Measurements	New section	
Equipment Configuration	New section	
Data Aggregation and Data Retention Settings	New section	
Saving Performance Collection Files	New section	
Creating and Editing Threshold Templates	Updates regarding threshold naming, SNMP traps, multiple variable, logical operators and trendline support	

Changed Item	Description	Date
Configuration Parameters	Section completely rewritten	Ver.3.1.10 March 2011
StarQuality Upgrade on Solaris	Added information about Oracle database restart	
StarQuality Installation	Updated Oracle Database installation procedures to include setting up the data files and redo logs.	
Table 6-1	New table	
	Replaced examples for specifying threshold attributes	
Licence Configuration	Added information on how to find out the database ID	
Table 2-3	Added opened port for discovering StarQuality from AlvariSTAR	
Equipment Deletion	Section removed	
Threshold Modification for Equipment	Section removed	
Editing Charts for Equipment	Section removed	
Creating and Editing Virtual Equipment	Section removed	
Linked Equipment	Section removed	
Customizing Display Preferences (Non-Administrator Users Only)	Section removed	
Customizing Public (Admin only) and Private Menu Items	Section removed	
Configuring Public and Private Charts	Section removed	
Installation on Linux Server with External Oracle Database on the Same Machine	New section	
"User levels and Their Settings" on page 5	Converted the information into a table.	Ver.3.5 Jan. 2012
"Installing StarQuality" on page 38	■ Added Oracle XE option ■ Added "Installation Troubleshooting" on page 116	
Configuring Network Ports	Added SMTP server 25	
General	Added internal cross references for easier navigation	

Changed Item	Description	Date
Chapter 3, Getting Started	■ Converted information into tables ■ Moved "Search" into this chapter	Ver.3.5 Jan. 2012
Chapter 4, Network Discovery	■ Restructured ■ Overview - Updated the supported versions ■ Setting Automatic Discovery of Equipment from AlvariSTAR - new section ■ Moved the following to Chapter 11, Device Specific Information: » "Setting the Delay Parameter on 4Motion Base Stations" » "Setting the Timeout and Retry Parameters for 4Motion TFTP" » "Saving Performance Collection Files" ■ Scheduled Configuration - section removed	
Displaying Elements Side-by-Side	New section	
Chapter 6, Setting Alarm Thresholds	■ New sections » Automatic Assignment of Threshold Templates » Importing and Exporting Threshold Templates ■ "To create a new threshold template:" on page 176 - added new fields	
Chapter 8, Reports	■ Revised chapter ■ New Sections: » "Importing and Exporting Report Definitions" on page 217 » "Scheduling Report Delivery" on page 219 » "Bulk Export External API" on page 229 » "To delete an On-Demand report:" on page 216	

Changed Item	Description	Date
Chapter 9, General Setting Options	■ Completely revised chapter to describe only applicable tasks ■ Moved "Search" to "Getting Started" ■ "Audit Trail" and "User Administration" - sections removed ■ New functionality: » "Managing Equipment with Unsuccessful Measurements" on page 240 » "Managing Inactive Equipments" on page 242 » "Merging Sector Data Following Sector Name Change" on page 243 » "4Motion Data Collection Gap Filling" on page 245	Ver.3.5 Jan. 2012
Chapter 11, Device Specific Information	■ Added "Saving Performance Collection Files" on page 275 ■ Added 4Motion Ver.3.5 ■ Added KPIs for Extreme Ver.1.8 ■ Restructured the tables to include measurement names together with their codes.	
Chapter 10, Northbound Interface (NBI)	Revised	

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About this Manual

The StarQuality User Manual comprises the following chapters:

Chapter 1- Introduction - provides an overview of the StarQuality system and its functionality.

Chapter 2 - StarQuality Installation - describes how to install and uninstall the StarQuality application and use commands to start and stop it.

Chapter 3 - Getting Started - describes the structure of the interface windows, logging in, general display options, searching, the menu system, operations and navigation, and editing of objects.

Chapter 4 - Network Discovery - describes the creation of a WiMAX network and all the BTSs under it. In addition, it describes the creation of a utility network.

Chapter 5 - Viewing Measurements - describes browsing options, display options, viewing measurement data, searching measurements and saving items as a submenu.

Chapter 6 - Setting Alarm Thresholds - describes how to create threshold templates and assigning them to equipment.

Chapter 7 - Threshold-Crossing Alarms Monitoring- describes the alarms and how to navigate, view and filter them. It also explains how to download data to Excel files.

Chapter 8 - Reports - Setting and viewing reports.

Chapter 9 - General Setting Options - describes how to set the site and equipment configuration, thresholds, customizing, server configuration and management, audit trail and user administration.

Chapter 10 - Northbound Interface (NBI)- describes the StarQuality Northbound Interface (NBI) functionality

Chapter 11- Device Specific Information - contains details about software compatibility, traffic and performance counters, codes for thresholds and default built-in reports.

Glossary - Explanation of commonly used terms.

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Chapter 1 - Introduction

In this chapter:

- "System Overview" on page 2
- "System Data Structure" on page 4
- "User levels and Their Settings" on page 5

1.1 System Overview

1.1.1 General

StarQuality is a carrier-class performance and traffic monitoring system that optimizes WiMAX network performance, identifies network problems and bottlenecks, maximizes traffic capacity and optimizes resource allocation.

StarQuality performance and traffic monitoring system ensures QoS and WiMAX network optimization. It provides various sets of lists and report types through an intuitive and simple Web-GUI client. It also enables defining Threshold Crossing Alerts: an alarm may be generated depending on the occurrence of several rule violations.

StarQuality is an essential element for optimizing the wireless network functionality, radio planning, ensuring service performance and problem identification.

1.1.2 Star Management Suite Overview

The Star management suite is a comprehensive, robust, carrier-grade network management solution for enabling rapid network deployment and seamless, cost-effective operation of WiMAX services. The Star Suite includes:

- **AlvariSTAR**: Base station management for WiMAX network deployment and operation
- **StarACS**: Device management system supporting TR-69 devices
- **StarDM**: Large-scale, multi-protocol, standards-based device management system supporting WiMAX devices for automated device activation and service introduction
- **StarQuality**: Performance and traffic monitoring system for ensuring QoS and WiMAX network optimization
- **StarReport**: Powerful Business Objects-based tool providing network configuration and performance visibility for improved decision support

1.1.3 Supported Equipment

1.1.3.1 WiMAX

- BreezeMAX FDD Ver.3.5 and later (FDD SNMP) - Micro and Macro BTS
- BreezeMAX FDD Ver.3.7 and later (FDD TFTP) - Micro and Macro BTS
- BreezeMAX TDD Ver.4.5 and later (TDD TFTP) - Macro BTS only
- 4Motion Ver.2.5M and later
- BreezeACCESS VL Ver.6 and later
- BreezeMAX Extreme Ver.1.5 and later

1.1.3.2 Server Health

- AlvariSTAR Ver.4.0 and later
- Oracle database server
- UNIX OS

1.2 System Data Structure

The basic entities comprising the StarQuality network are:

- Equipment - also referred to as the device:
  - » BTS (Base Transceiver Station) and SU for wireless networks
  - » AlvariSTAR, Oracle database server and UNIX machine for Server Health.

  Each piece of equipment belongs to a site.
- Basic sampled unit:
  - » SU, Slot/BS (*n* times in each BTS) for wireless networks, BTS for common measurements
  - » AlvariSTAR, Oracle database server and UNIX machine for Server Health.
- Site – a collection of equipments and/or sites. Each site can contain as many sites and equipment as required, within a hierarchy.
- Root – a virtual site – a collection of sites only

A bare System contains only ROOT.

1.3 User levels and Their Settings

In StarQuality, different users can have different access rights to various objects. The administrator user (admin) has the highest permission level. The user groups are:

Table 1-1: User Levels and Permissions

Level	**Administrators**			**Users**	
Type	**admin User**	**Administrator**	**Restricted**	**Normal**	**Limited**
Default password	admin123	N/A	N/A	N/A	N/A
Tasks					
Create, modify and view objects according to privileges	✓	✓	✓	✓	✓
Change password	✓	✓	✓	✓	-
Create, modify and delete administrator users	✓	-	✓ (only those created by them)	-	-
Create, modify and delete servers or server groups		-	✓ (limited by User Admin)	-	-
View entries in audit log	✓	✓	✓(only those created by them)		
View the operating system level user password on some computers	✓	-	-	-	-
Change and view the licenses used	✓	-	-	-	-
Set preferences		✓	-	✓	-
Create a private virtual hierarchy and charts		✓	-	✓	-
Modify templates, reports, servers, events and maps	✓		- (except the exclusion windows)	-	-

For further information, refer to the "Managing Licences" on page 257.

Chapter 2 - StarQuality Installation

In this chapter:

- "Introduction" on page 7
- "Installation on Windows Server with Internal Oracle Database" on page 13
- "Installation on Windows Server with External Oracle Database on the Same Machine" on page 30
- "Installation on Windows Server with Oracle Database on a Separate Machine" on page 48
- "Installation on Solaris Server with Internal Oracle Database" on page 63
- "Installation on Solaris Server with External Oracle Database on the Same Machine" on page 70
- "Installation on Solaris Server with Oracle Database on a Separate Machine" on page 78
- "Installation on Linux Server with External Oracle Database on the Same Machine" on page 86
- "Installation on Linux Server with Oracle Database on a Separate Machine" on page 96
- "Running StarQuality" on page 105
- "StarQuality Upgrade" on page 111
- "Uninstalling StarQuality" on page 114
- "Installation Troubleshooting" on page 116

2.1 Introduction

2.1.1 Installation Types

StarQuality can be installed on systems/machines running Windows or UNIX-like operating systems with internal or external databases. This chapter is divided into sections according to the type of operating system and type of database installation.

Following are the possible StarQuality installation configurations:

- Installation on Windows
  - with internal Oracle Database
  - with external Oracle Database on the same machine
  - with Oracle Database on a separate machine
- Installation on Solaris
  - with internal Oracle Database
  - with external Oracle Database on the same machine
  - with Oracle Database on a separate machine
- Installation on Linux
  - with external Oracle Database on the same machine
  - with Oracle Database on a separate machine

Before installation, refer to Table 2-1 below to determine which type of installation to use:

Table 2-1: Selecting Installation Types

Operating system	System architecture	Installation Sources	Oracle database server version	Oracle client version (installed on StarQuality machine)	Refer to
Windows 2008 Standard/R2	**Internal database (Windows 2008 R2 only)**	■ Cygwin ■ StarQuality ISO	Oracle SW and patch supplied with the StarQuality DVD	No Oracle client required	"Installation on Windows Server with Internal Oracle Database" on page 13
	External database on same machine	■ Cygwin ■ StarQuality.exe ■ Oracle Server Installation	■ For R2 - Version supplied with the StarQuality DVD ■ For 2008 Standard - 10203_vista_w2k8_x86_production_db		"Installation on Windows Server with External Oracle Database on the Same Machine" on page 30
	External database on a separate machine	■ Cygwin ■ Oracle Server Installation ■ Oracle Client installation (same version as server) ■ StarQuality.exe	Consult the Oracle definitions for the machine and OS used for Oracle server	10203_vista_w2k8_x86_production_client	"Installation on Windows Server with Oracle Database on a Separate Machine" on page 48

Table 2-1: Selecting Installation Types (Continued)

Operating system	System architecture	Installation Sources	Oracle database server version	Oracle client version (installed on StarQuality machine)	Refer to
Solaris 10 x86	**Internal database**	■ StarQuality ISO	Oracle SW and patch supplied with the StarQuality DVD	No Oracle client required	"Installation on Solaris Server with Internal Oracle Database" on page 63
	External database on same machine	■ Oracle server installation ■ StarQuality	*Version supplied with StarQuality DVD (10201_database_solx86_64)		"Installation on Solaris Server with External Oracle Database on the Same Machine" on page 70
	External database on a separate machine	■ Oracle Server Installation ■ Oracle Client installation (same version as server) ■ StarQuality.exe	Consult the Oracle definitions for the machine and OS used for Oracle server	10201_client_solx86_64 or 10202_client_solx86	"Installation on Solaris Server with Oracle Database on a Separate Machine" on page 78
RedHat 5 Linux x86_32	**External database on same machine**	■ Oracle Server Installation ■ StarQuality	*Consult the Oracle definitions for the machine and OS used for Oracle server	No Oracle client required	"Installation on Linux Server with External Oracle Database on the Same Machine" on page 86
	External database on a separate machine	■ Oracle Server ■ Oracle Client ■ StarQuality		Any Oracle 10 client compatible with 32 bit Red Hat 5	"Installation on Linux Server with Oracle Database on a Separate Machine" on page 96

Table 2-1: Selecting Installation Types (Continued)

Operating system	System architecture	Installation Sources	Oracle database server version	Oracle client version (installed on StarQuality machine)	Refer to
Demo/Trial	**External database on same machine**	■ Cygwin ■ StarQuality.exe ■ Oracle Server Installation	■ For R2 - Version supplied with the StarQuality DVD ■ For 2008 Standard - 10203_vista_w2k8_x86_production_db		RN

* The Oracle kit included in the DVD covers the Oracle license only if it is installed together with StarQuality (internal database installation). If you install an external DB, purchase a licence separately.

2.1.2 General Prerequisites

The following are general prerequisites for all installation types:

- The computer on which the server is installed must comply with the hardware and software requirements detailed in the Release Notes.
- The computer on which the StarQuality Server and/or Oracle database are installed must be dedicated to running these applications.
- The Operating System must be freshly installed.
- The computers should have the latest Operating System updates.
- The StarQuality application requires a minimum of 20 GB free storage space.
- A valid StarQuality license (required for initial activation after installation)
- On windows, the installation should be done by a local user with administrator rights (preferably administrator user)

2.1.3 HW, SW and Disk Allocation Requirements

The following table lists the requirements for hardware, software, and disk space, depending on the equipment capacity and operating system.

Table 2-2: Requirements Based on Capacity

Maximum Capacity	Operating Systems	HW Requirements for Each Server	Disk Allocation
1. 50 BTSs 2. 1000 CPEs 3. 5 concurrent clients	■ Windows 2003 (64Bit) customer upgraded, OR ■ Windows 2008 (64Bit) Standard Edition English, OR ■ RedHat 5 Linux x86_32 (Enterprise English) - requires PAE kernel package for more than 4 GB RAM support.	1. 1 x Intel Core i7-950 at 3.06 GHz or higher 2. 8 GB RAM 3. 4 x HDD SAS 150 GB, 15000 RPM	1. 1 x 150 GB: OS + StarQuality + Oracle 2. 1 x 150 GB: StarQuality Oracle Tablespace 3. 1 x 150 GB: Oracle Redo Log + Undo Tablespace
1. 200 BTSs 2. 10,000 CPEs 3. 20 concurrent clients	■ Windows 2008 R2 (64Bit) Standard Edition English, OR ■ RedHat 5 Linux x86_32 (Enterprise English) - requires PAE kernel package for more than 4 GB RAM support, OR ■ SolarisX86 10 64bit English	1. 1 x Intel XEON E5620 (2.4 GHz) 2. 12 GB RAM 3. 4 x HDD SAS 300 GB, 15000 RPM For Solaris x86, the network card and RAID controller must be listed in their respective developer approved lists.	1. 1 x 300 GB: OS + StarQuality + Oracle 2. 2 x 300 GB (RAID0): StarQuality Oracle Tablespace 3. 1 x 300 GB: Oracle Redo Log + Undo Tablespace
1. 350 BTSs 2. 50,000 CPEs 3. 20 concurrent clients	■ Windows 2008 R2 (64Bit) Standard Edition English, OR ■ SolarisX86 10 64bit English	1. 1 x Intel XEON E5620 (2.4GHz) 2. 16 GB RAM 3. 4 x HDD SAS 300 GB, 15000 RPM For Solaris x86, the network card and RAID controller must be listed in their respective developer approved lists.	1. 1 x 300 GB: OS + StarQuality + Oracle 2. 2 x 300 GB (RAID0): StarQuality Oracle Tablespace 3. 1 x 300: Oracle Redo Log + Undo Tablespace

Table 2-2: Requirements Based on Capacity (Continued)

Maximum Capacity	Operating Systems	HW Requirements for Each Server	Disk Allocation
1. 1000 BTSs 2. 100,000 CPEs 3. 20 concurrent clients	SolarisX86 10 64bit English	1. 1 x Intel XEON E5630 (2.53GHz) 2. 24 GB RAM 3. 6 x HDD SAS 500 GB, 15000 RPM The network card and RAID controller must be listed in their respective Solaris developer approved lists.	1. 1 x 500 GB: OS + StarQuality + Oracle 2. 4 x 500 GB (RAID0): StarQuality Oracle Tablespace 3. 1 x 500 GB: Oracle Redo Log Assumes 15 min. cycles data retention for 1 month and 1 hour averages data retention for 11 months.
1. 1300 BTSs 2. 130,000 CPEs 3. 20 concurrent clients	SolarisX86 10 64bit English	1. 2 x Intel XEON E5630 (2.4GHz) 2. 32 GB RAM 3. 7 x HDD SAS 500 GB, 15000 RPM The network card and RAID controller must be listed in their respective Solaris developer approved lists.	1. 1 x 500 GB: OS + StarQuality + Oracle 2. 5 x 500 GB (RAID0): StarQuality Oracle Tablespace 3. 1 x 500 GB: Oracle Redo Log Assumes 15 min. cycles data retention for 1 month and 1 hour averages data retention for 11 months.

2.2 Installation on Windows Server with Internal Oracle Database

Before beginning the StarQuality installation, refer to Table 2-1 to ensure that this is the correct installation for your system, and perform all the tasks outlined in Section 2.2.1 below.

This installation type involves the installation of the following components:

- cygwin
- StarQuality

The required steps are:

1. Configure network ports (Section 2.2.1.1)
2. Install Cygwin (Section 2.2.1.2)
3. Install StarQuality (Section 2.2.2.2)
4. Load a StarQuality license (Section 2.10.1)
5. Run StarQuality (Section 2.10.2)

2.2.1 Pre-installation Tasks

2.2.1.1 Configuring Network Ports

Configure or verify that the following ports are open between the server machine, client machine, managed network equipment and other NMS/OSS elements:

Table 2-3: Network Ports

Use	Port	Protocol	Direction
App. server and managed equipment	161	SNMP	Outbound towards NE
App. server, managed equipment and other NMS/OSS elements	162	SNMP	Outbound towards NMS/OSS elements
App. server and managed equipment	69	TFTP	From Managed equipment to StarQuality
App. server and client	8080		Inbound/Outbound between client and server
Sending requests to AlvariSTAR in order to reach KPI	16162	SNMP	
Setting up AlvariSTAR to discover StarQuality	10161		
SMTP server	25	SMTP	Outbound towards SMTP server

2.2.1.2 Installing Cygwin

Cygwin is a UNIX-like environment for Windows. Always use the cygwin application to run StarQuality commands.

You can download the Cygwin Installation files from the Alvarion FTP Server, or from the internet.

To install Cygwin:

1 Download Cygwin files:

» From the internet - Make sure the Cygwin version you download includes the following packages:

Sapache	base-files	base-passwd
bash	binutils	bzip2
coreutils	crypt	cygrunsrv
cygutils	cygwin	editrights
expat	findutils	gawk
gcc-core	gcc-g++	gcc-mingw-core
gcc-mingw-g++	grep	gzip
less	libbz2_1	libdb4.5
libexpat1	libexpat1-devel	libgdbm4
libiconv2	libintl3	libintl8
libncurses8	libpcre0	libpopt0
libreadline6	libwrap0	login
make	mingw-runtime	minires
openssh	openssl	perl - version 5.8.x.x
ping	sed	tar
termcap	terminfo	texinfo
tzcode	vim	w32api
which	zlib	

OR

» From Alvarion FTP server - Download the *CygwinFromWwwGoh4Com.zip* file from ftp://downloads.alvarion.com/StarSuite/Star Quality/Installations/ (Username and password are required when connecting as an Alvarion customer).

2 Extract the zip file into a folder with a path that does not include spaces.

3 From the extracted files, run the *setup.exe* file; The Cygwin Net Release Setup Program window is displayed.

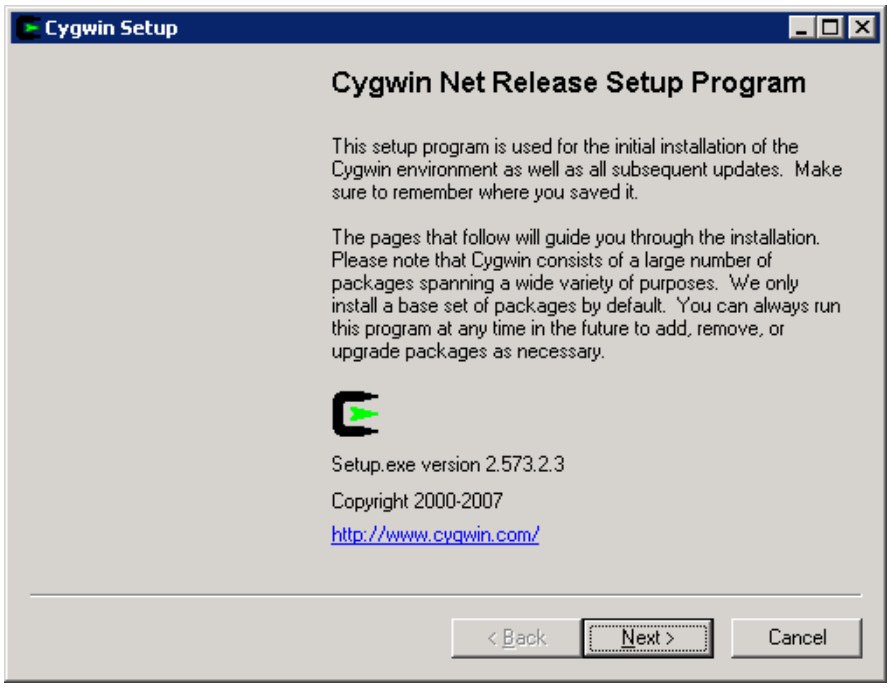

Cygwin Setup
Cygwin Net Release Setup Program
This setup program is used for the initial installation of the Cygwin environment as well as all subsequent updates. Make sure to remember where you saved it.
The pages that follow will guide you through the installation. Please note that Cygwin consists of a large number of packages spanning a wide variety of purposes. We only install a base set of packages by default. You can always run this program at any time in the future to add, remove, or upgrade packages as necessary.
Setup.exe version 2.573.2.3
Copyright 2000-2007
http://www.cygwin.com/
< Back
Next >
Cancel

Figure 2-1: Cygwin Net Release Setup Program Window

4 Click **Next**. The Choose a Download Source window is displayed.

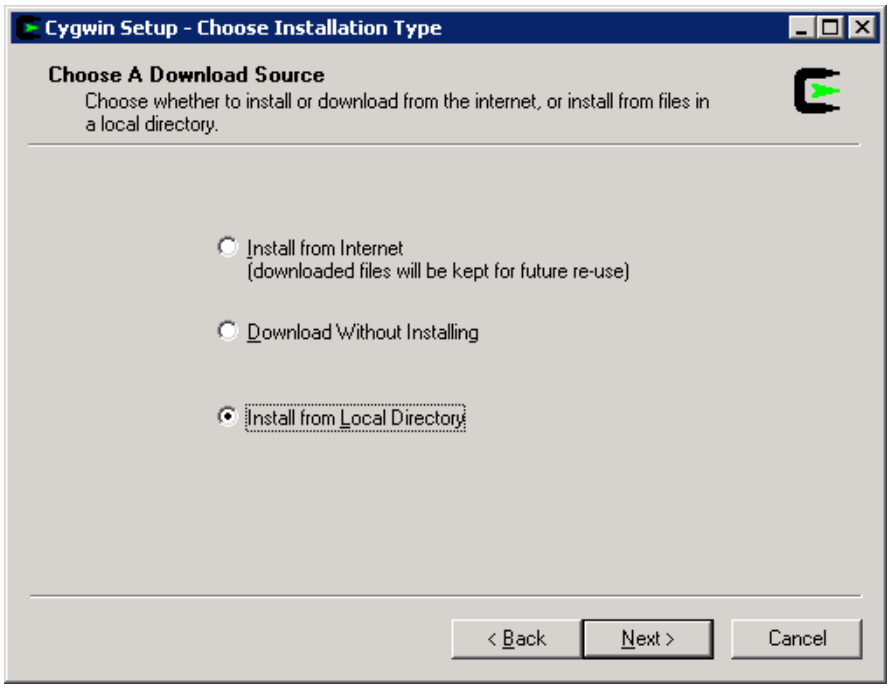

Cygwin Setup - Choose Installation Type
Choose A Download Source
Choose whether to install or download from the internet, or install from files in a local directory.
Install from Internet
(downloaded files will be kept for future re-use)
Download Without Installing
Install from Local Directory
< Back
Next >
Cancel

Figure 2-2: Choose a Download Source Window

5 Select Install from Local directory and click **Next**. The Select Root Install Directory window is displayed.

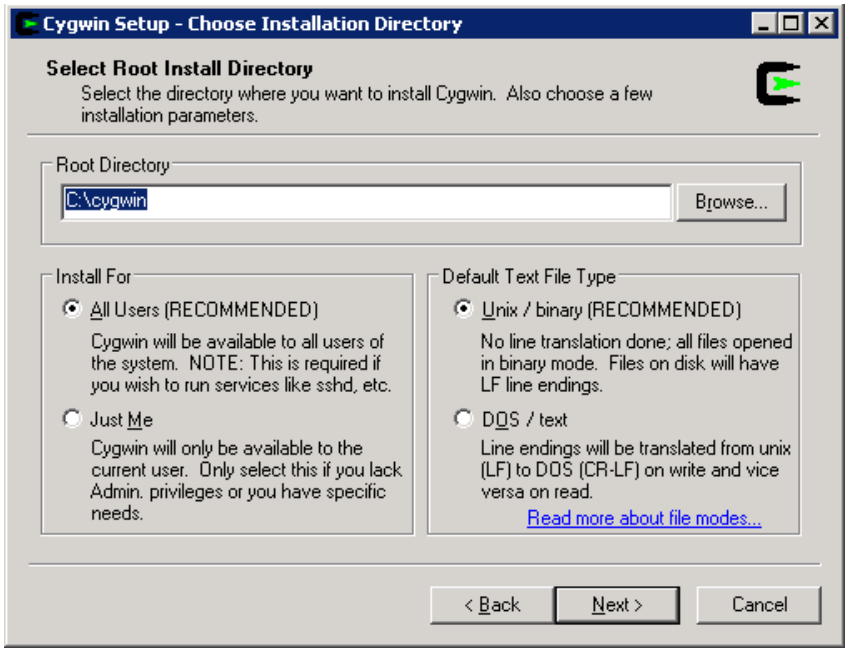

Cygwin Setup - Choose Installation Directory
Select Root Install Directory
Select the directory where you want to install Cygwin. Also choose a few installation parameters.
Root Directory
C:\cygwin
Browse...
Install For
All Users (RECOMMENDED)
Cygwin will be available to all users of the system. NOTE: This is required if you wish to run services like sshd, etc.
Just Me
Cygwin will only be available to the current user. Only select this if you lack Admin. privileges or you have specific needs.
Default Text File Type
Unix / binary (RECOMMENDED)
No line translation done; all files opened in binary mode. Files on disk will have LF line endings.
DOS / text
Line endings will be translated from unix (LF) to DOS (CR-LF) on write and vice versa on read.
Read more about file modes...
< Back
Next >
Cancel

Figure 2-3: Select Root Install Directory Window

6 Choose the default settings recommended on the screen. Verify that the Root directory is a local drive and click **Next**. The Select Local Package Directory window is displayed.

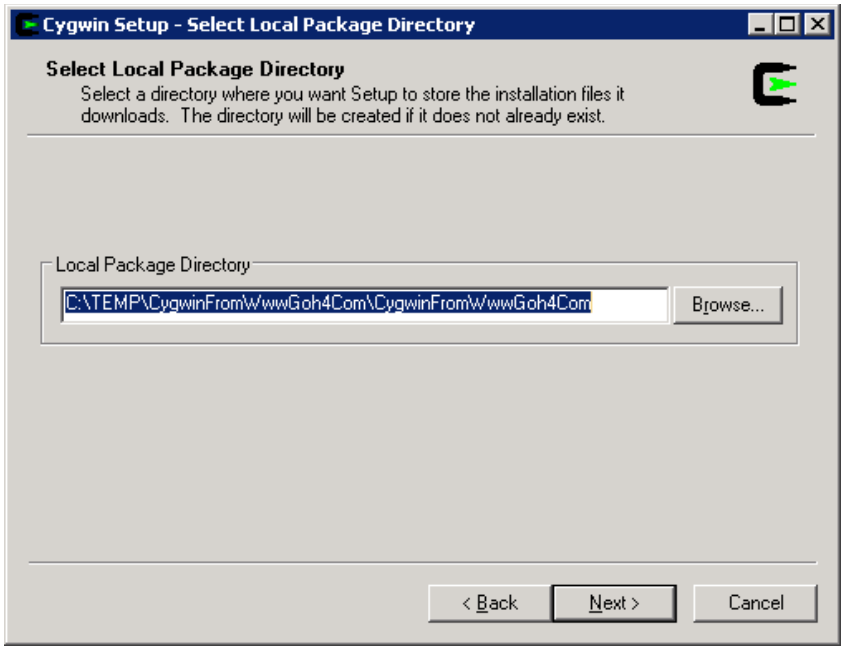

Cygwin Setup - Select Local Package Directory
Select Local Package Directory
Select a directory where you want Setup to store the installation files it downloads. The directory will be created if it does not already exist.
Local Package Directory
C:\TEMP\CygwinFromWwwGoh4Com\CygwinFromWwwGoh4Com
Browse...
< Back
Next >
Cancel

Figure 2-4: Select Local Package Directory Window

7 Verify that the path to the Local Package Directory is correct and click **Next**. The Select Packages window is displayed.

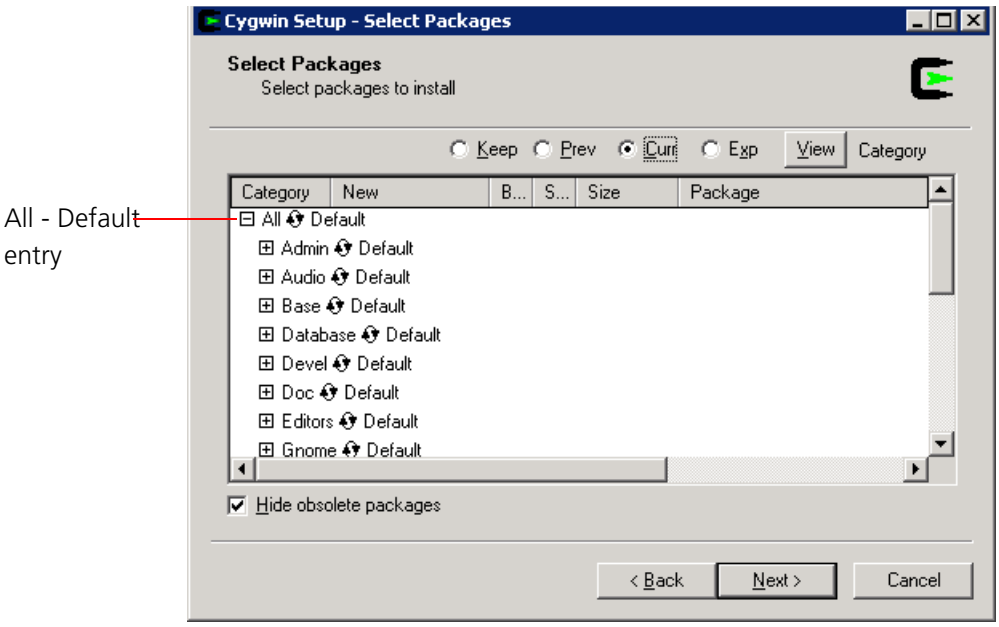


Figure 2-5: Select Packages Window - All Default (Initial State)

8 Click on the word “Default” in the main “All” entry (package) (see Figure 2-6) and change it to “Install”.

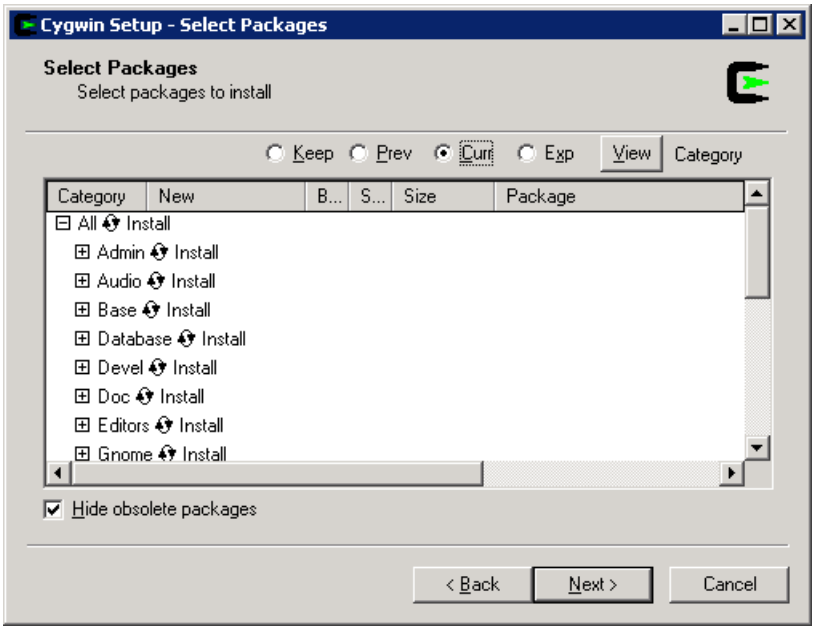


Figure 2-6: Select Packages Window - All “Install”

9 Verify that all the entries under the “All” main package have also been changed to “Install”. If not, change them.

10 Scroll down to the Perl package and expand it by clicking on the + sign.

11 Check the sub-package under Perl. If it is different than 5.8.x.x (e.g. “skip”), click on it to change it to the required 5.8.x.x.

INFORMATION

The Perl version must be 5.8.x.x, otherwise it does not meet the StarQuality requirements. If you have a different Perl version, use a different cygwin installation package.

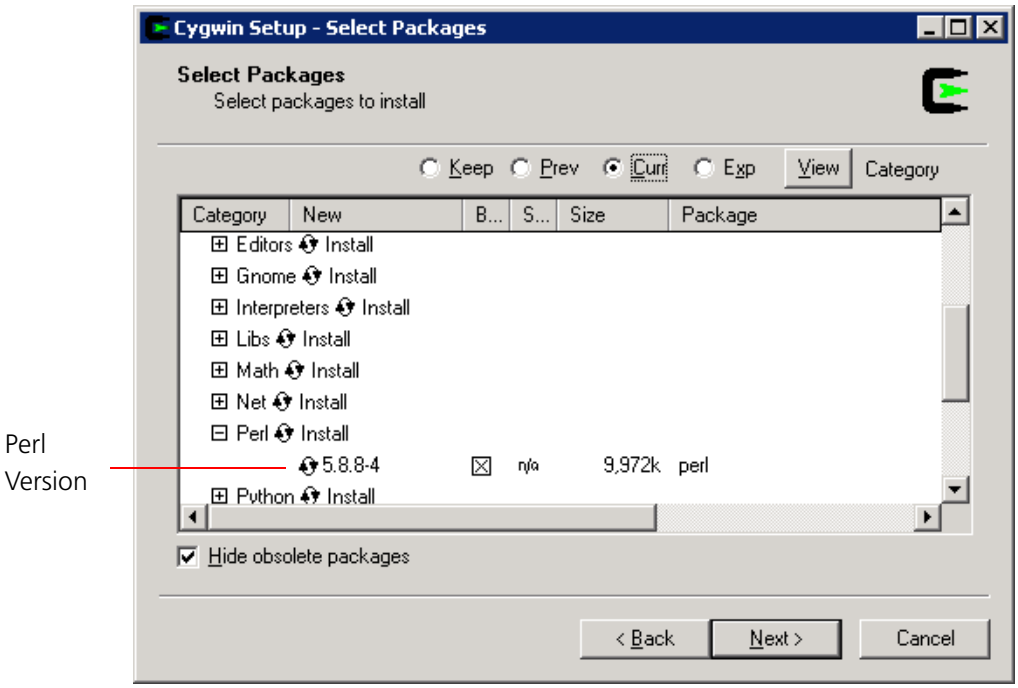


Figure 2-7: Select Packages Window - Perl Version

12 Click **Next**. The installation procees starts.

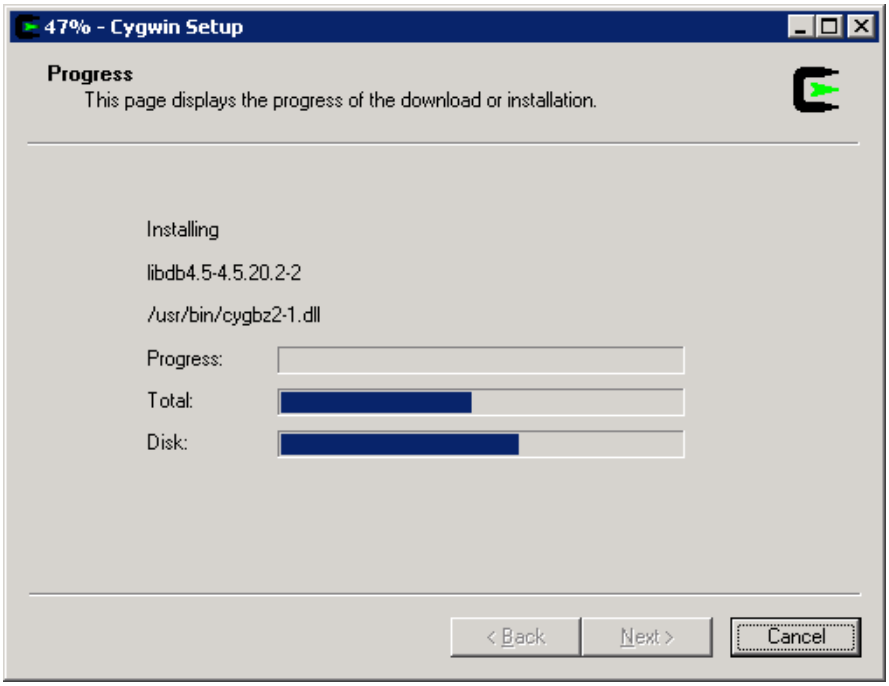


Figure 2-8: Cygwin Installation Process

13 Click **Finish**.

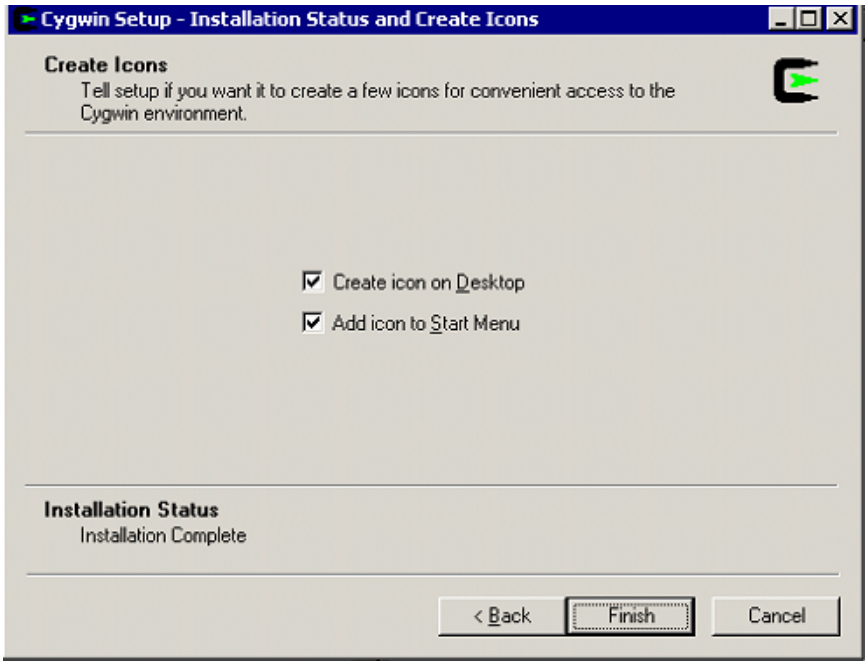

Cygwin Setup - Installation Status and Create Icons
Create Icons
Tell setup if you want it to create a few icons for convenient access to the Cygwin environment.
Create icon on Desktop
Add icon to Start Menu
Installation Status
Installation Complete
< Back
Finish
Cancel

Figure 2-9: Cygwin Installation Completion

2.2.2 Installing StarQuality

2.2.2.1 Overview

This Installation type is applicable when installing StarQuality on Windows server with internal Oracle database (refer to Table 2-1).

The installation must be performed by a local administrator user.

During the installation, the installer writes information into two destinations: the Details view and the log file. To display the Details view, click **Show Details** in the installation wizard. The log file is located in the *Temp* directory of the user (by default *C:\Documents and Settings\<USER>\Local Settings\Temp*).

2.2.2.2 Procedure

1. Ensure that the pre-installation tasks are complete as required in Section 2.2.1
2. Insert the installation DVD into the DVD drive and copy the Installation folder directly onto one of the disk drives (for example: *C:*).

NOTE!

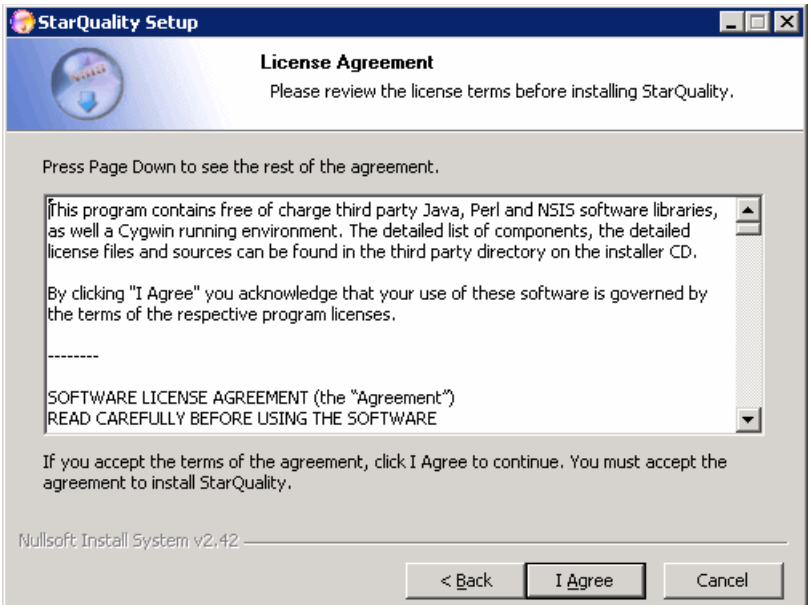
Do not place the installation files into a folder with a long path (e.g. on the desktop). This is an Oracle installer limitation.

3. Run the installation program *starquality.exe*. The installation wizard is displayed.

StarQuality Setup
Welcome to the StarQuality Setup Wizard
This wizard will guide you through the installation of StarQuality.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

Figure 2-10: StarQuality Setup Wizard Window

4 Click **Next**. The wizard displays the license agreement. Read the agreement carefully.


StarQuality Setup
License Agreement
Please review the license terms before installing StarQuality.
Press Page Down to see the rest of the agreement.
This program contains free of charge third party Java, Perl and NSIS software libraries, as well a Cygwin running environment. The detailed list of components, the detailed license files and sources can be found in the third party directory on the installer CD.
By clicking "I Agree" you acknowledge that your use of these software is governed by the terms of the respective program licenses.

SOFTWARE LICENSE AGREEMENT (the "Agreement")
READ CAREFULLY BEFORE USING THE SOFTWARE
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install StarQuality.
Nullsoft Install System v2.42
< Back
I Agree
Cancel

Figure 2-11: Licence Agreement

5 Click **I Agree**. The wizard displays components to install.

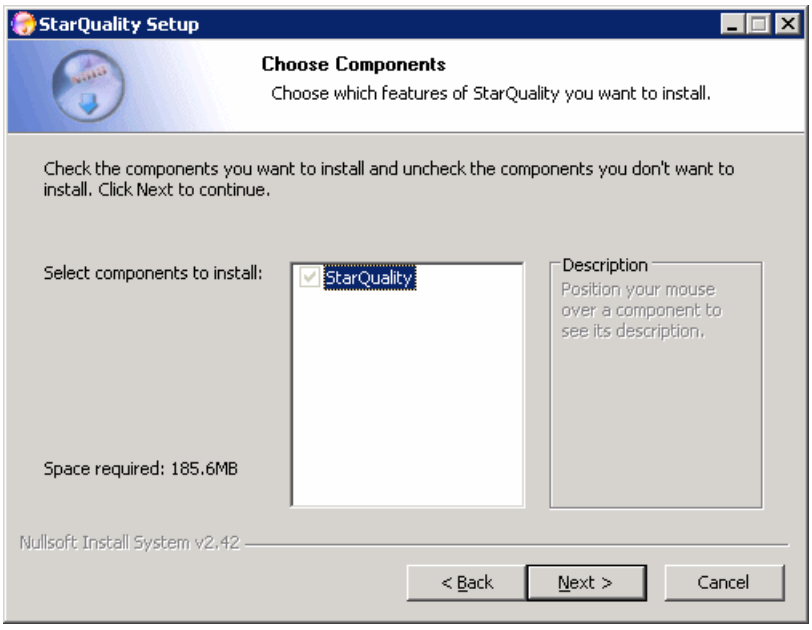

StarQuality Setup
Choose Components
Choose which features of StarQuality you want to install.
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select components to install:
StarQuality
Description
Position your mouse over a component to see its description.
Space required: 185.6MB
Nullsoft Install System v2.42
< Back
Next >
Cancel

Figure 2-12: Choose Components

6 Click **Next**. The StarQuality installation starts. To view detailed information, click **Show Details**. You can copy the content of the details view for reference.

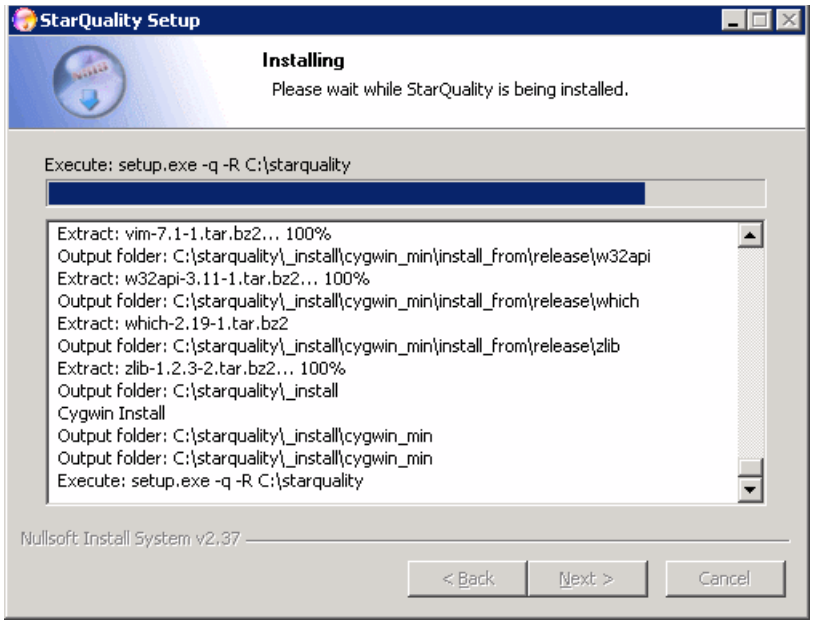


Figure 2-13: StarQuality Installing

The last page indicates that the basic installation is complete.

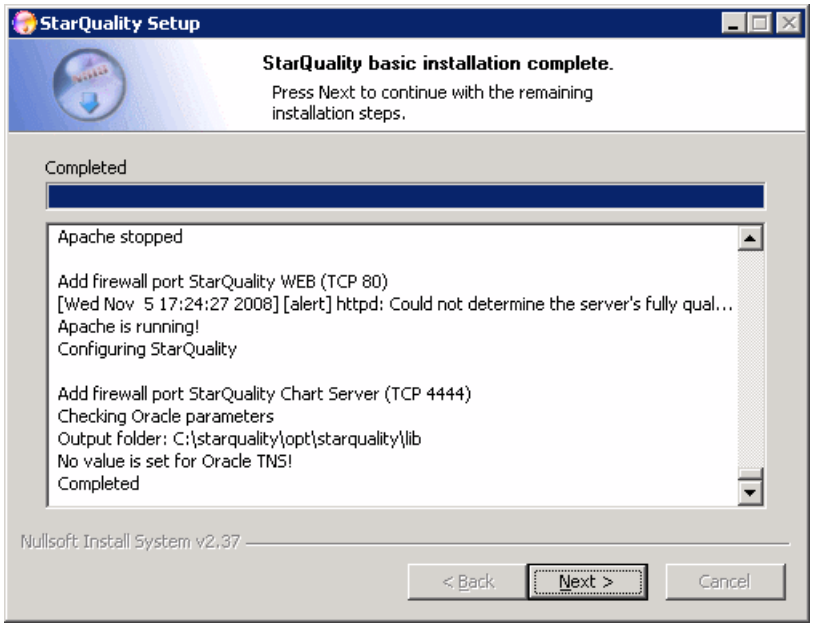

StarQuality Setup
StarQuality basic installation complete.
Press Next to continue with the remaining installation steps.
Completed
Apache stopped
Add firewall port StarQuality WEB (TCP 80)
[Wed Nov 5 17:24:27 2008] [alert] httpd: Could not determine the server's fully qual...
Apache is running!
Configuring StarQuality
Add firewall port StarQuality Chart Server (TCP 4444)
Checking Oracle parameters
Output folder: C:\starquality\opt\starquality\lib
No value is set for Oracle TNS!
Completed
Nullsoft Install System v2,37
< Back
Next >
Cancel

Figure 2-14: StarQuality Basic Installation Complete

7 Click **Next**. The installer prompts for the Oracle installation and patch, located on the StarQuality DVD (Figure 2-15).

8 Enter the path to the Oracle installer folder. You can click **Browse** to navigate to the folder.

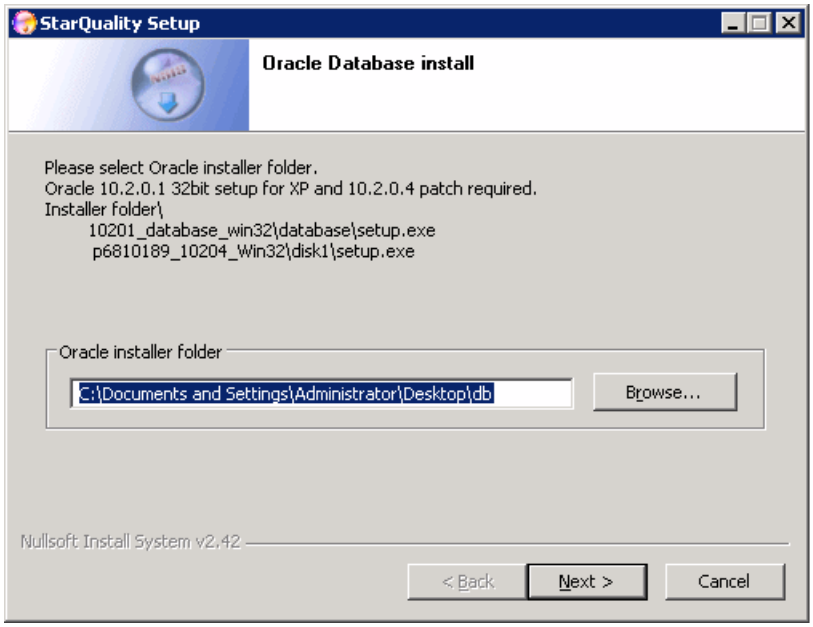


Figure 2-15: Oracle Database Install

9 Click **Next**. The StarQuality Installation window is displayed (Figure 2-16).

10 Click **Browse** to change the default Oracle home directory.

NOTE!

The Oracle home directory must be on the same disk drive as the StarQuality (Cygwin) root directory (see Figure 2-3).

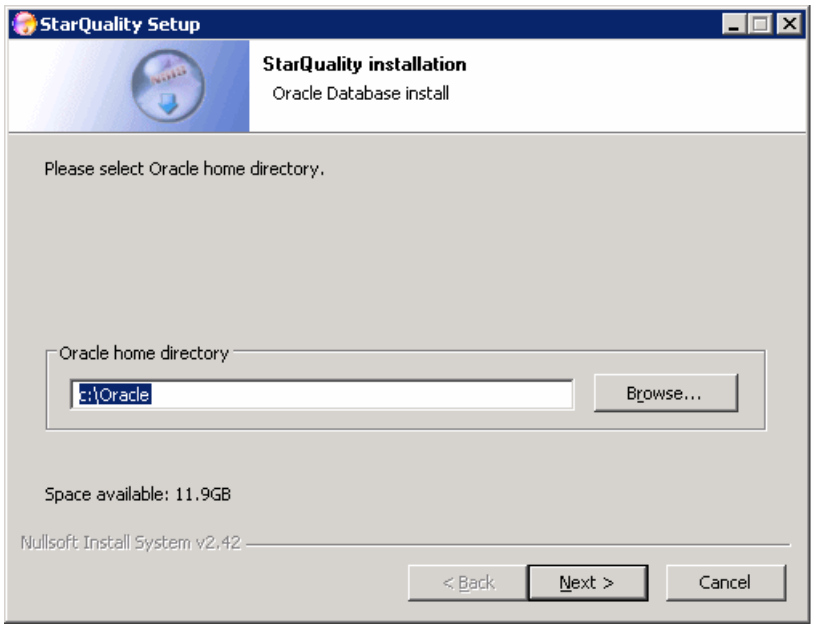


Figure 2-16: Oracle Directory

a Click **Next**. A command line window is displayed (Figure 2-17), showing the Oracle database installation progress.

INFORMATION

The Oracle database installation may take 30-60 minutes, depending on the machine characteristics. During this time, the installation progress is displayed in the console. If the console is idle for more than 10 minutes, check for errors.

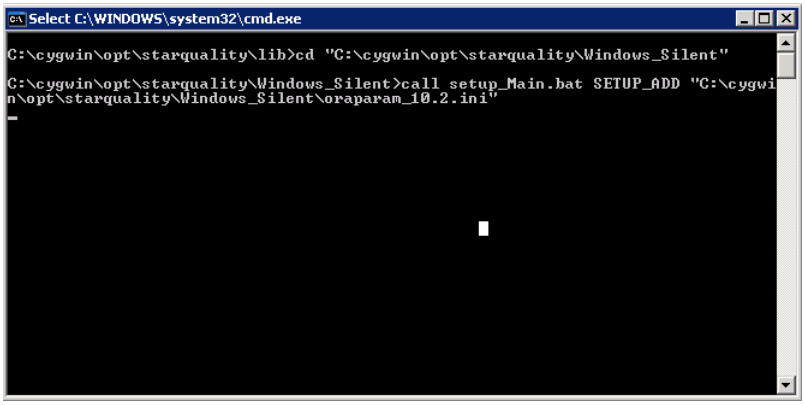


Figure 2-17: Installation Progress

11 Enter and confirm the required password. Use the Windows password for the same user, or leave empty.

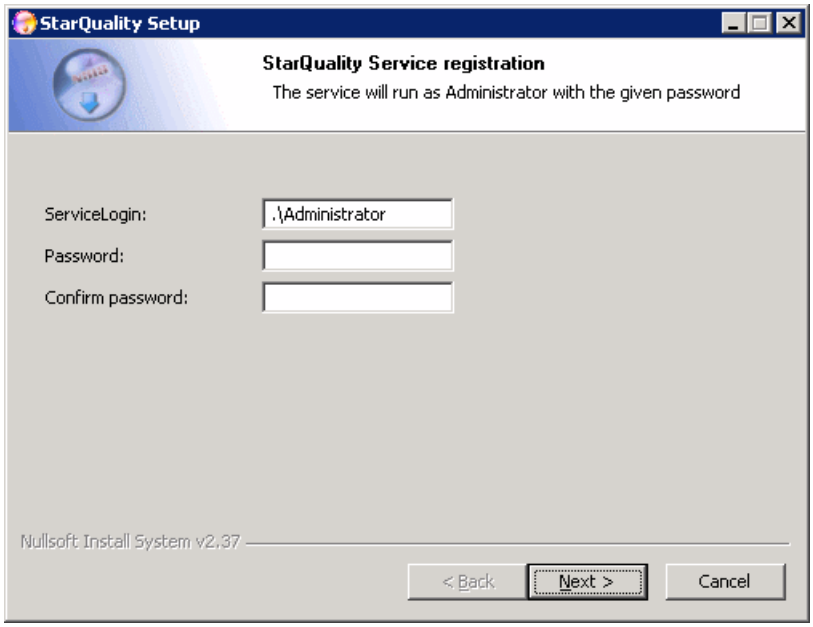


Figure 2-18: StarQuality Windows Service Registration

12 Click **Next**. The Oracle Connection page is displayed (Figure 2-19).

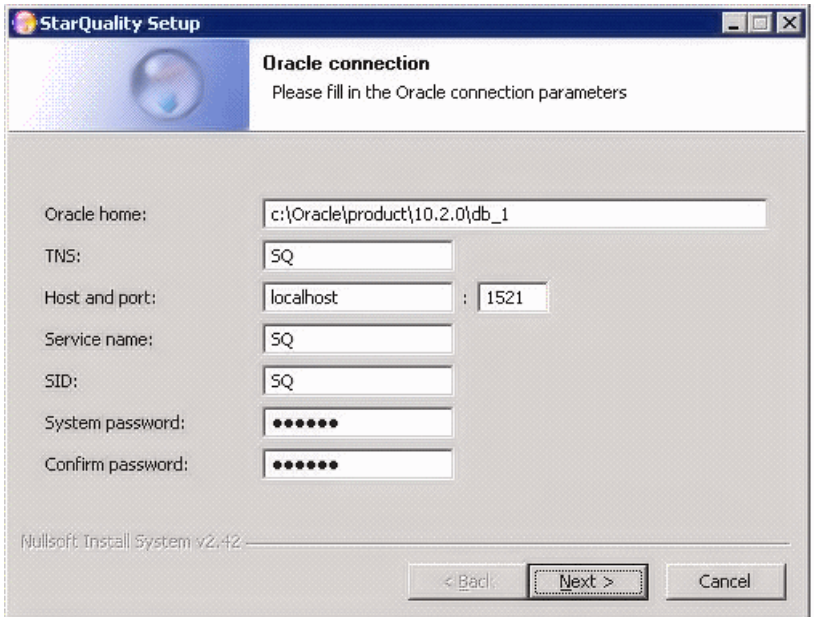


Figure 2-19: Oracle Connection Parameters

13 Enter missing parameters and verify that the correct values are filled out in the following fields:

Table 2-4: Oracle Connection Parameters

Parameter	Description	Comments
Oracle Home	The path to the Oracle Home directory.	Verify that automatic value is correct
TNS	The Transparent Network Substrate (TNS) name to be used for the database connection.	The TNS name appears in the *tnsnames.ora* file on the StarQuality machine. For internal Oracle: SQ
Host and port	The host of the Oracle database server and the port used for connecting to it.	The default port for internal Oracle is 1521. Host can be any of the following: ■ localhost (recommended) ■ Host name ■ IP ■ 127.0.0.1
Service name	Service name of Oracle server/client	If this value is defined do not fill in SID. For internal Oracle: SQ
SID	Service ID, in case service ID is defined in Oracle server/client	If this value is defined do not fill in Service name

Table 2-4: Oracle Connection Parameters

Parameter	Description	Comments
System password and Confirm password	The password of the SYSTEM user in the database.	For internal Oracle: oracle.

14 Click **Next**. The Oracle Connection Tablespace parameters is displayed. Point both CONF. and DATA tablespaces to the Oracle data computer partition according to Table 2-2, Disk Allocation.

15 Review the creation details of CONF and DATA tablespaces.

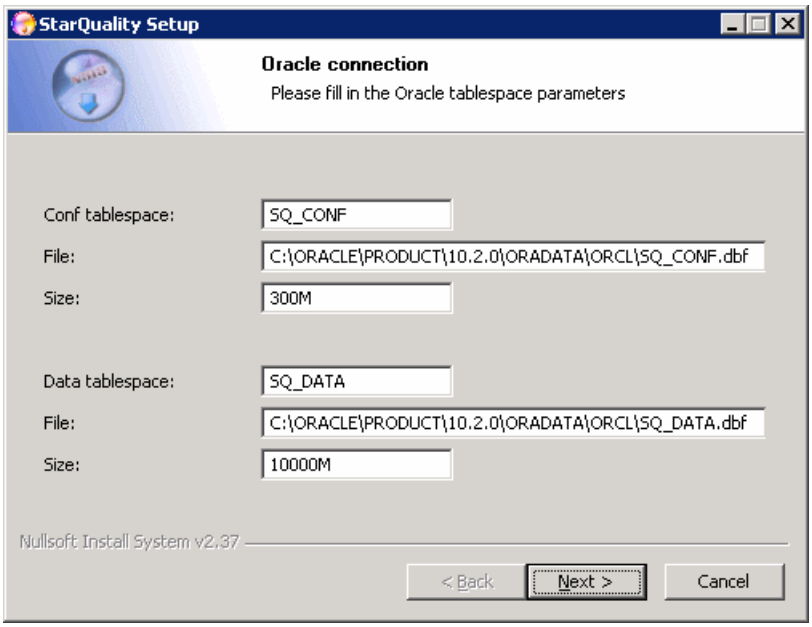


Figure 2-20: Oracle Connection - Tablespace Parameters

16 Click **Next**. The Oracle user parameters are displayed. You can change and confirm the password.

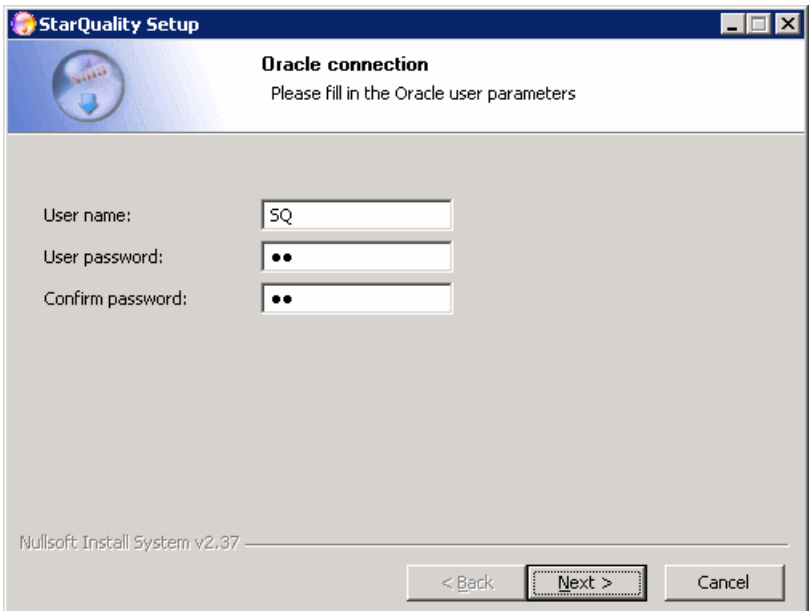


Figure 2-21: Oracle Connection - User Parameters

17 Click **Next**. The Setup wizard is displayed, prompting that the installation is complete.

Figure 2-22: StarQuality Setup Wizard - Completing Installation

18 Click **Finish** to close the wizard.

19 Set up the Oracle data files and redo logs according to the expected database size and system load. For details on these procedures, check the relevant Oracle Database documentation.

20 Load a licence and run StarQuality. Refer to:

- "Loading a StarQuality Licence" on page 105
- "Running StarQuality on Windows" on page 105

2.3 Installation on Windows Server with External Oracle Database on the Same Machine

Before beginning the StarQuality installation refer to Table 2-1 to ensure that this is the correct installation for your system. Check that you have performed all the tasks outlined in Section 2.3.1 below.

This installation type involves the installation of the following components:

- Oracle server (Oracle client is not required)
- cygwin
- StarQuality

The required steps are:

1. Configure network ports (Section 2.3.1.1)
2. Install Oracle server (Section 2.3.1.2)
3. Install Cygwin (Section 2.3.2)
4. Install StarQuality (Section 2.3.2.2)
5. Load a StarQuality license (Section 2.10.1)
6. Run StarQuality (Section 2.10.2)

2.3.1 Pre-installation Tasks

2.3.1.1 Configuring Network Ports

The following ports must be open between the server machine, client machine, managed network equipment and other NMS/OSS elements:

Table 2-5: Network Ports

Use	Port	Protocol	Direction
App. server and managed equipment	161	SNMP	Outbound towards NE
App. server, managed equipment and other NMS/OSS elements	162	SNMP	Outbound towards NMS/OSS elements
App. server and managed equipment	69	TFTP	From Managed equipment to StarQuality
App. server and client	8080		Inbound/Outbound between client and server
Oracle communication client - server	As installed (Default: 1521)		From StarQuality to Oracle and from Oracle to StarQuality
Sending requests to AlvariSTAR in order to reach KPI	16162	SNMP	
SMTP server	25	SMTP	Outbound towards SMTP server

2.3.1.2 Installing Oracle Server

Follow these guidelines:

- Consult Table 2-1 for the correct Oracle Server version.
- Install Oracle Server according to instructions issued by Oracle corporation.
- Make sure that the database is set to a minimum of 170 processes.
- During StarQuality installation, the Oracle server must be running, and the database connection from the StarQuality machine must be available.

  To test connectivity to the database server from the StarQuality machine, use the *sqlplus* utility as follows:

  a Switch to the command prompt (on Windows) or use a console (on Solaris, logged in as the Oracle user).

  b Enter the following command: `sqlplus system/oracle@testme` (assuming that the database SID is testme and the system password is oracle).
  If the SQL prompt is displayed, connectivity to the database server is confirmed. Report any error message the database administrator.

  c Enter `exit` (Windows) or `quit` (Solaris) to complete the procedure.

- The following Oracle database information must be available when installing StarQuality:
  - Service name (or Service ID)
  - TNS (Transparent Network Substrate)
  - Password for SYSTEM user

2.3.1.3 Installing Cygwin

Cygwin is a UNIX-like environment for Windows. Always use the cygwin application to run StarQuality commands.

You can download the Cygwin Installation files from the Alvarion FTP Server, or from the internet.

To install Cygwin:

1. Download Cygwin files:
   - From the internet - Make sure the Cygwin version you download includes the following packages:

Sapache	base-files	base-passwd
bash	binutils	bzip2
coreutils	crypt	cygrunsrv
cygutils	cygwin	editrights
expat	findutils	gawk
gcc-core	gcc-g++	gcc-mingw-core
gcc-mingw-g++	grep	gzip
less	libbz2_1	libdb4.5
libexpat1	libexpat1-devel	libgdbm4
libiconv2	libintl3	libintl8
libncurses8	libpcre0	libpopt0
libreadline6	libwrap0	login
make	mingw-runtime	minires
openssh	openssl	perl - version 5.8.x.x
ping	sed	tar
termcap	terminfo	texinfo
tzcode	vim	w32api

which zlib

OR

» From Alvarion FTP server - Download the *CygwinFromWwwGoh4Com.zip* file from ftp://downloads.alvarion.com/StarSuite/Star Quality/Installations/ (Username and password are required when connecting as an Alvarion customer).

2 Extract the zip file into a folder with a path that does not include spaces.

3 From the extracted files, run the *setup.exe* file; The Cygwin Net Release Setup Program window is displayed.

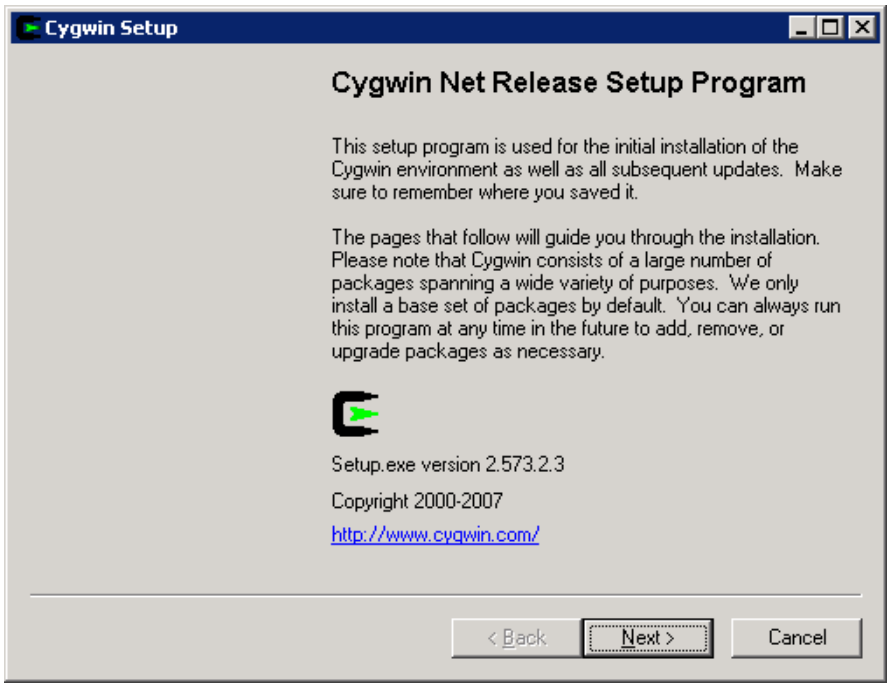

Cygwin Setup
Cygwin Net Release Setup Program
This setup program is used for the initial installation of the Cygwin environment as well as all subsequent updates. Make sure to remember where you saved it.
The pages that follow will guide you through the installation. Please note that Cygwin consists of a large number of packages spanning a wide variety of purposes. We only install a base set of packages by default. You can always run this program at any time in the future to add, remove, or upgrade packages as necessary.
Setup.exe version 2.573.2.3
Copyright 2000-2007
http://www.cygwin.com/
< Back
Next >
Cancel

Figure 2-23: Cygwin Net Release Setup Program Window

4 Click **Next**. The Choose a Download Source window is displayed.

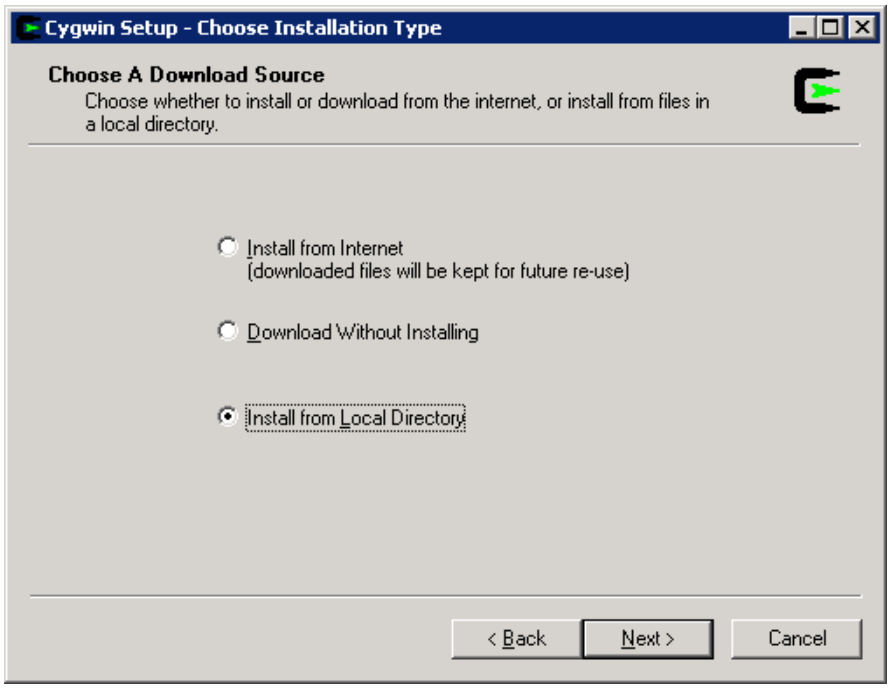

Cygwin Setup - Choose Installation Type
Choose A Download Source
Choose whether to install or download from the internet, or install from files in a local directory.
Install from Internet
(downloaded files will be kept for future re-use)
Download Without Installing
Install from Local Directory
< Back
Next >
Cancel

Figure 2-24: Choose a Download Source Window

5 Select Install from Local directory and click **Next**. The Select Root Install Directory window is displayed.

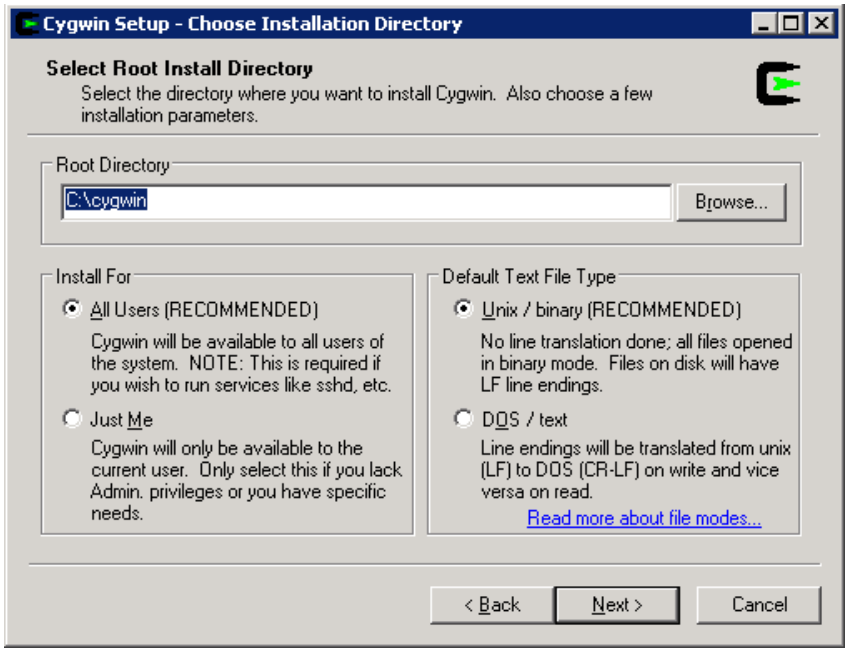

Cygwin Setup - Choose Installation Directory
Select Root Install Directory
Select the directory where you want to install Cygwin. Also choose a few installation parameters.
Root Directory
C:\cygwin
Browse...
Install For
All Users (RECOMMENDED)
Cygwin will be available to all users of the system. NOTE: This is required if you wish to run services like sshd, etc.
Just Me
Cygwin will only be available to the current user. Only select this if you lack Admin. privileges or you have specific needs.
Default Text File Type
Unix / binary (RECOMMENDED)
No line translation done; all files opened in binary mode. Files on disk will have LF line endings.
DOS / text
Line endings will be translated from unix (LF) to DOS (CR-LF) on write and vice versa on read.
Read more about file modes...
< Back
Next >
Cancel

Figure 2-25: Select Root Install Directory Window

6 Choose the default settings recommended on the screen. Verify that the Root directory is a local drive and click **Next**. The Select Local Package Directory window is displayed.

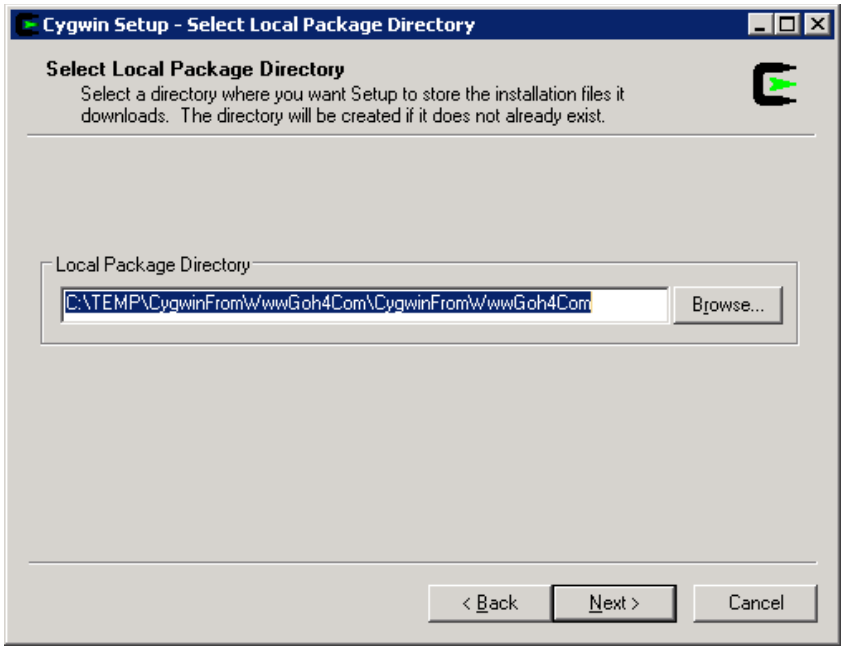

Cygwin Setup - Select Local Package Directory
Select Local Package Directory
Select a directory where you want Setup to store the installation files it downloads. The directory will be created if it does not already exist.
Local Package Directory
C:\TEMP\CygwinFromWwwGoh4Com\CygwinFromWwwGoh4Com
Browse...
< Back
Next >
Cancel

Figure 2-26: Select Local Package Directory Window

7 Verify that the path to the Local Package Directory is correct and click **Next**. The Select Packages window is displayed.

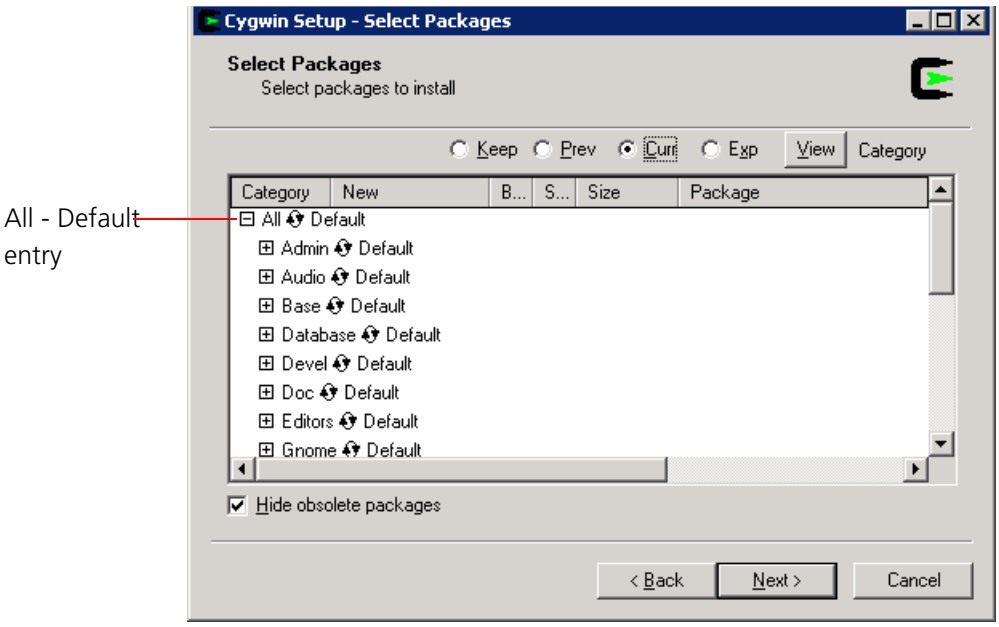


Figure 2-27: Select Packages Window - All Default (Initial State)

8 Click on the word “Default” in the main “All” entry (package) (see Figure 2-6) and change it to “Install”.

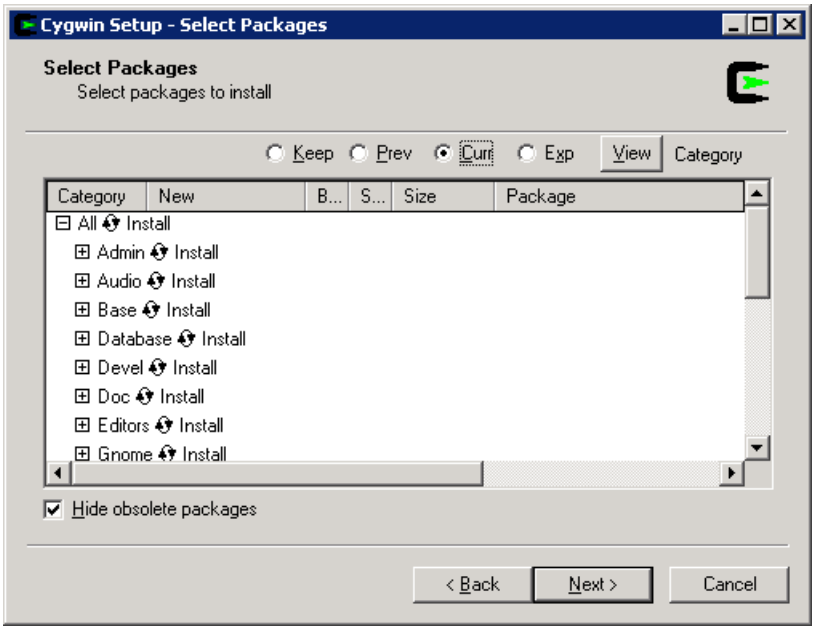


Figure 2-28: Select Packages Window - All “Install”

9 Verify that all the entries under the “All” main package have also been changed to “Install”. If not, change them.

10 Scroll down to the Perl package and expand it by clicking on the + sign.

11 Check the sub-package under Perl. If it is different than 5.8.x.x (e.g. “skip”), click on it to change it to the required 5.8.x.x.

INFORMATION

The Perl version must be 5.8.x.x, otherwise it does not meet the StarQuality requirements. If you have a different Perl version, use a different cygwin installation package.

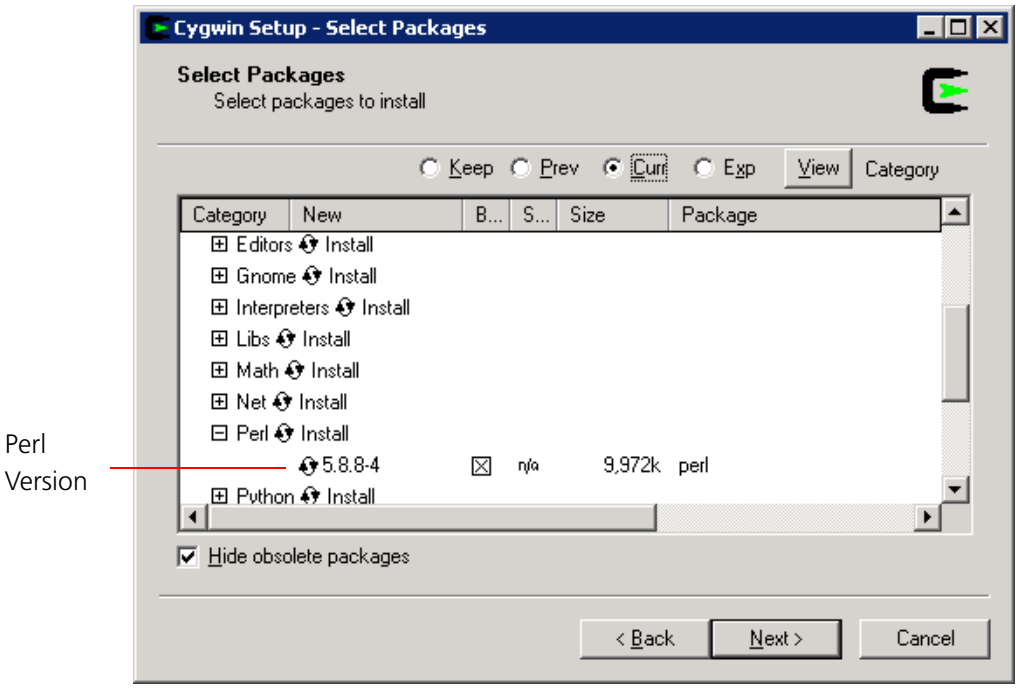


Figure 2-29: Select Packages Window - Perl Version

12 Click **Next**. The installation procees starts.

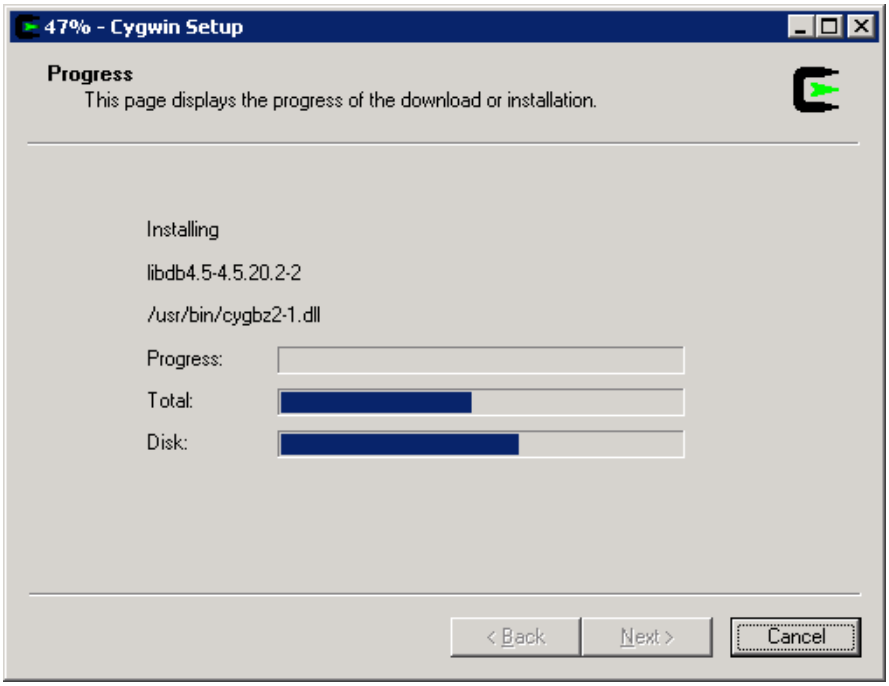


Figure 2-30: Cygwin Installation Process

13 Click **Finish**.

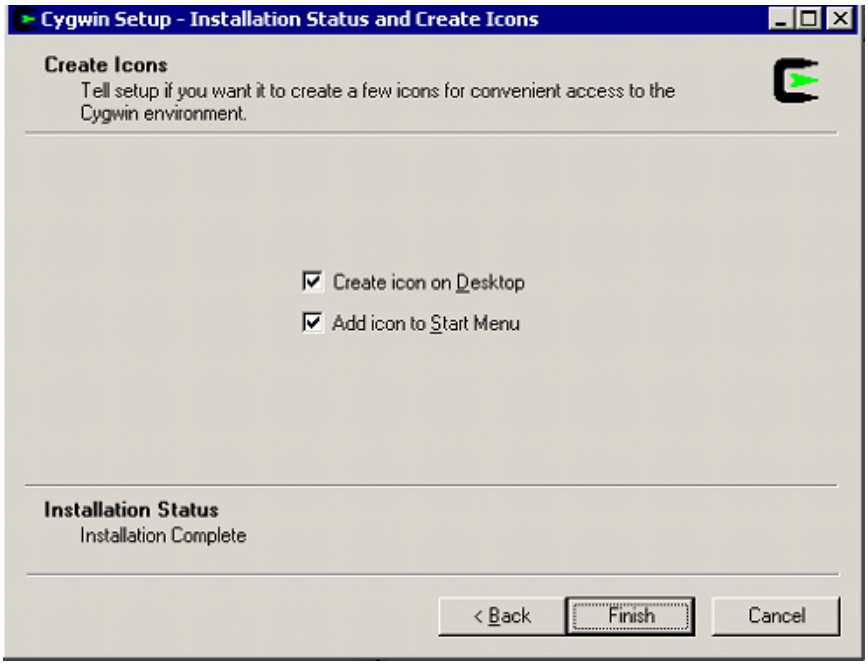

Cygwin Setup - Installation Status and Create Icons
Create Icons
Tell setup if you want it to create a few icons for convenient access to the Cygwin environment.
Create icon on Desktop
Add icon to Start Menu
Installation Status
Installation Complete
< Back
Finish
Cancel

Figure 2-31: Cygwin Installation Completion

2.3.2 Installing StarQuality

2.3.2.1 Overview

This Installation type is applicable when installing StarQuality on a Windows server with an external Oracle database on the same machine (refer to Table 2-1).

The installation has to be performed by a local administrator user.

During the installation, the installer writes information into two destinations: the Details view and the log file. To display the Details view, click **Show Details** in the installation wizard. The log file is located in the *Temp* directory of the user (by default *C:\Documents and Settings\<USER>\Local Settings\Temp*).

2.3.2.2 Procedure

1 Ensure that the pre-installation tasks are complete as required in Section 2.3.1.

2 Insert the installation DVD into the DVD drive and copy the Installation folder directly onto one of the disk drives (for example: C:\).

NOTE!

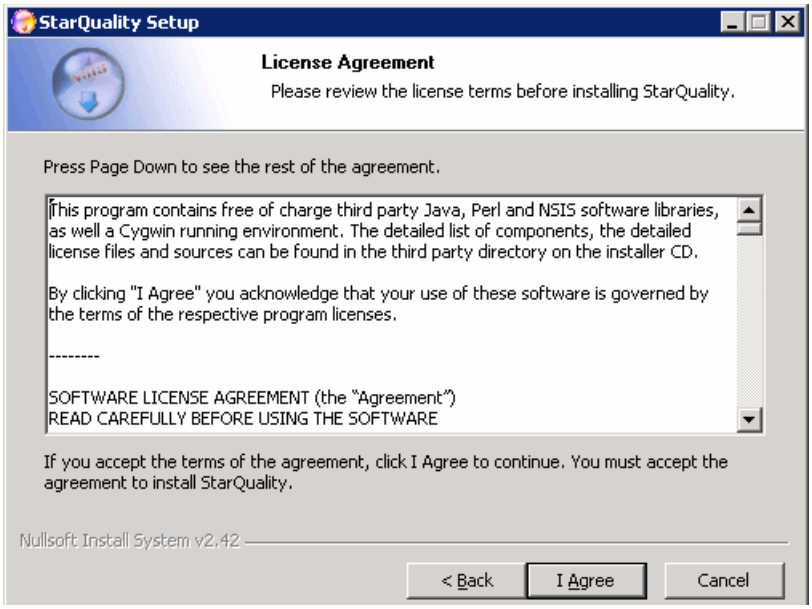
Do not place the installation files into a folder with a long path. This is an Oracle installer limitation.

3 Run the installation program *starquality.exe*. The installation wizard is displayed.

StarQuality Setup
Welcome to the StarQuality Setup Wizard
This wizard will guide you through the installation of StarQuality.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

Figure 2-32: StarQuality Setup Wizard Window

4 Click **Next**; The wizard displays the license agreement. Read the agreement carefully.


StarQuality Setup
License Agreement
Please review the license terms before installing StarQuality.
Press Page Down to see the rest of the agreement.
This program contains free of charge third party Java, Perl and NSIS software libraries, as well a Cygwin running environment. The detailed list of components, the detailed license files and sources can be found in the third party directory on the installer CD.
By clicking "I Agree" you acknowledge that your use of these software is governed by the terms of the respective program licenses.

SOFTWARE LICENSE AGREEMENT (the "Agreement")
READ CAREFULLY BEFORE USING THE SOFTWARE
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install StarQuality.
Nullsoft Install System v2.42
< Back
I Agree
Cancel

Figure 2-33: Licence Agreement

5 Click **I Agree**. The wizard displays components to install.

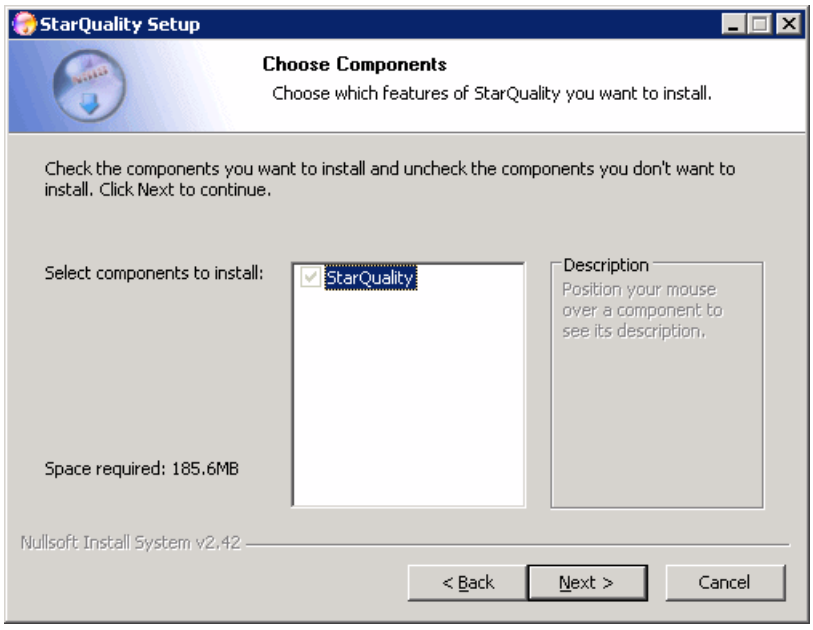

StarQuality Setup
Choose Components
Choose which features of StarQuality you want to install.
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select components to install:
StarQuality
Description
Position your mouse over a component to see its description.
Space required: 185.6MB
Nullsoft Install System v2.42
< Back
Next >
Cancel

Figure 2-34: Choose Components

6 Click **Next**. The StarQuality installation starts. To view detailed information, click **Show Details**. You can copy the content of the details view for reference.

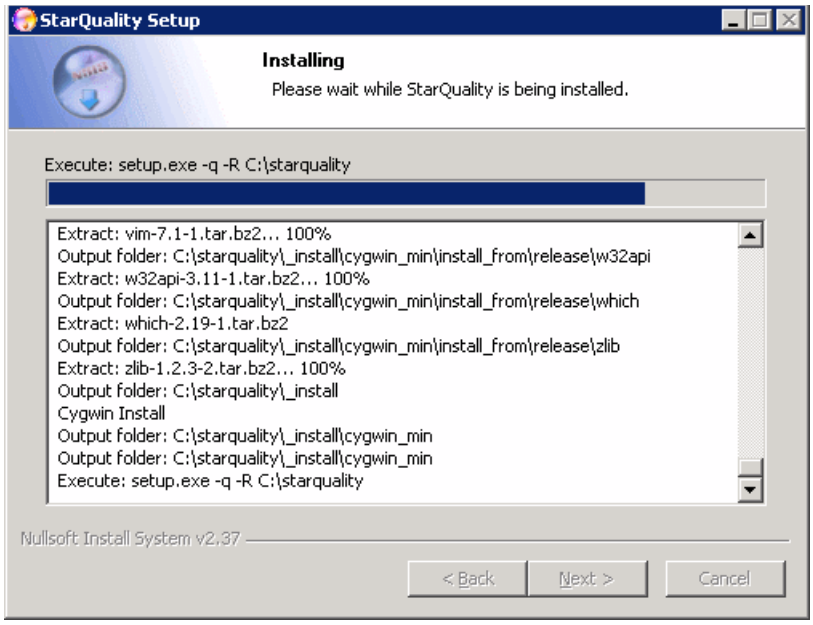


Figure 2-35: StarQuality Installing

The last page indicates that the basic installation is complete.

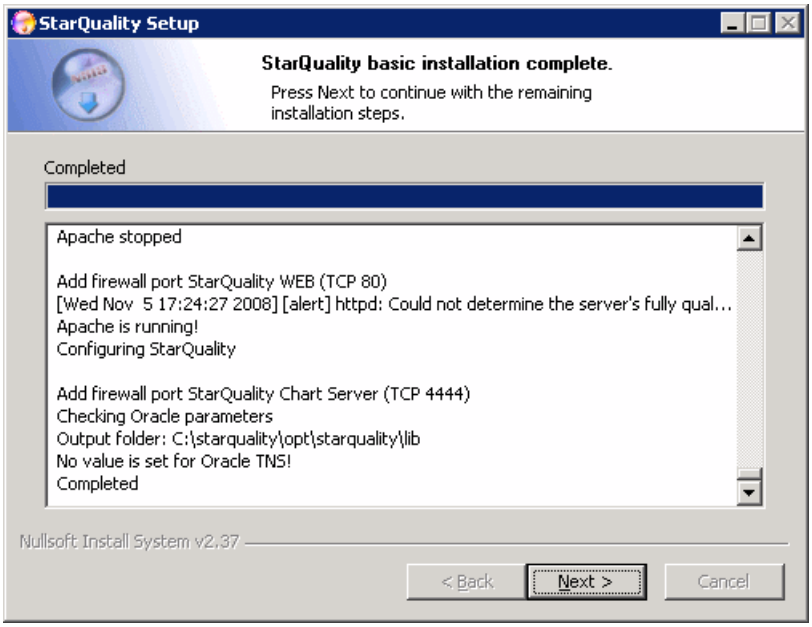

StarQuality Setup
StarQuality basic installation complete.
Press Next to continue with the remaining installation steps.
Completed
Apache stopped
Add firewall port StarQuality WEB (TCP 80)
[Wed Nov 5 17:24:27 2008] [alert] httpd: Could not determine the server's fully qual...
Apache is running!
Configuring StarQuality
Add firewall port StarQuality Chart Server (TCP 4444)
Checking Oracle parameters
Output folder: C:\starquality\opt\starquality\lib
No value is set for Oracle TNS!
Completed
Nullsoft Install System v2.37
< Back
Next >
Cancel

Figure 2-36: StarQuality Basic Installation Complete

7 Click **Next**; The Oracle Database Configuration window is displayed.

8 Choose one of the following options for database creation:

» Install Oracle Database 10g. If you choose this option, browse to the directory from which to install the database and the destination directory in which the database will be installed.

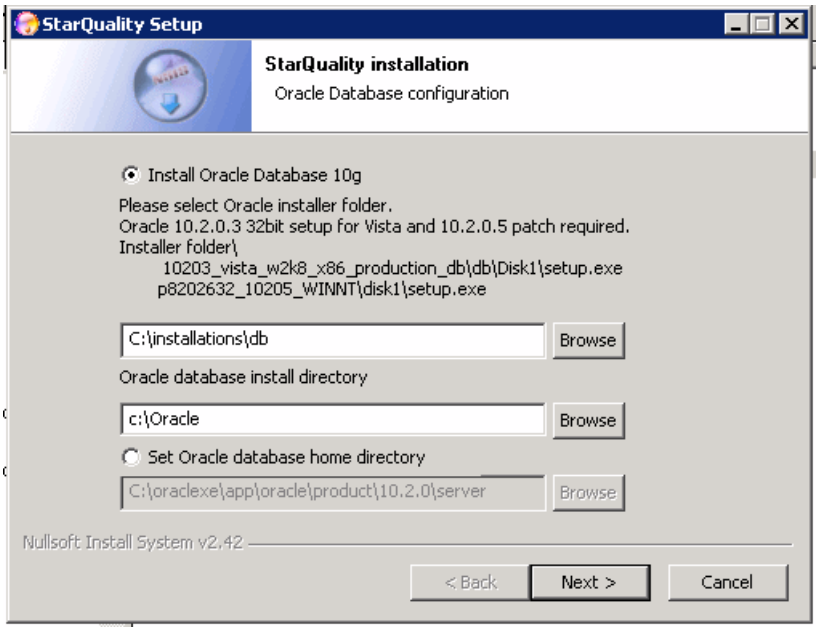


Figure 2-37: Oracle Database Configuration- 10g Option

» Set Oracle Database Home Directory. If you choose this option, browse to the directory from which to set the External Oracle database as the Oracle source.

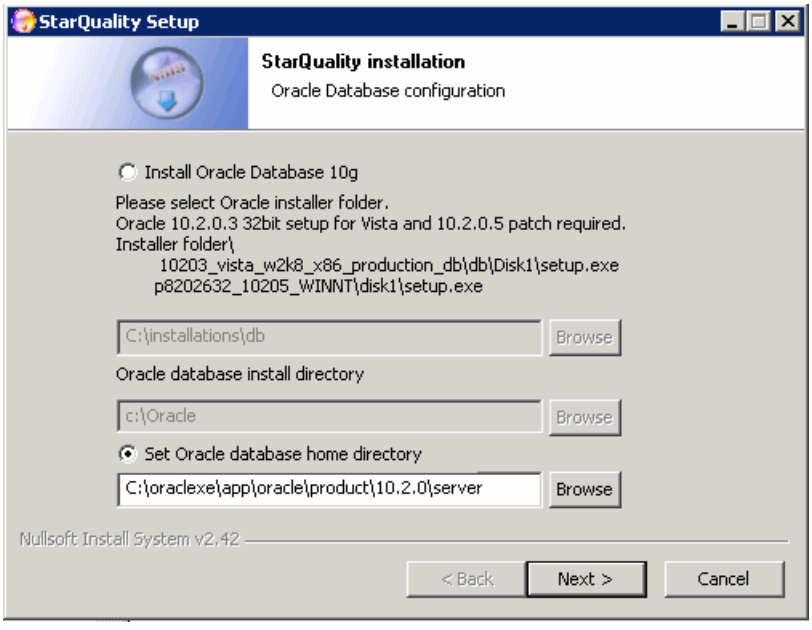


Figure 2-38: Oracle Database Configuration- External Oracle Option

9 Click **Next**.The StarQuality Windows Service Registration window is displayed (Figure 2-39). The service will be run with the given Windows user. Enter and confirm the required password. It is recommended to use the Windows password for the same user.

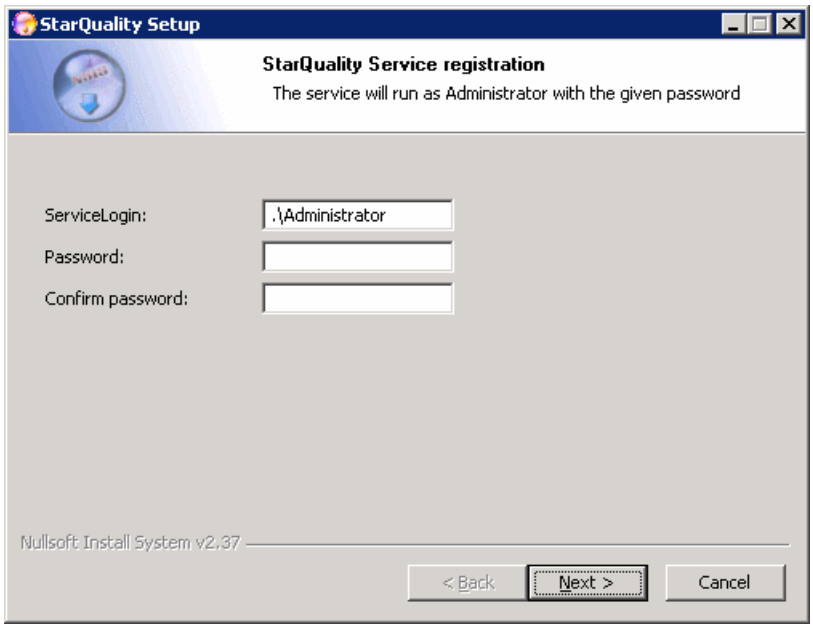


Figure 2-39: StarQuality Windows Service Registration

10 If you selected the Xe option in Step 8, increase the processes parameters using *sqlplus*, as follows:

a Open a command line window and enter the following in *C:\Users\Administrator>* (Figure 2-40):

```
sqlplus / as sysdba
Alter system set processes = 150 scope = spfile;
Shutdown immediate;
Startup;
```

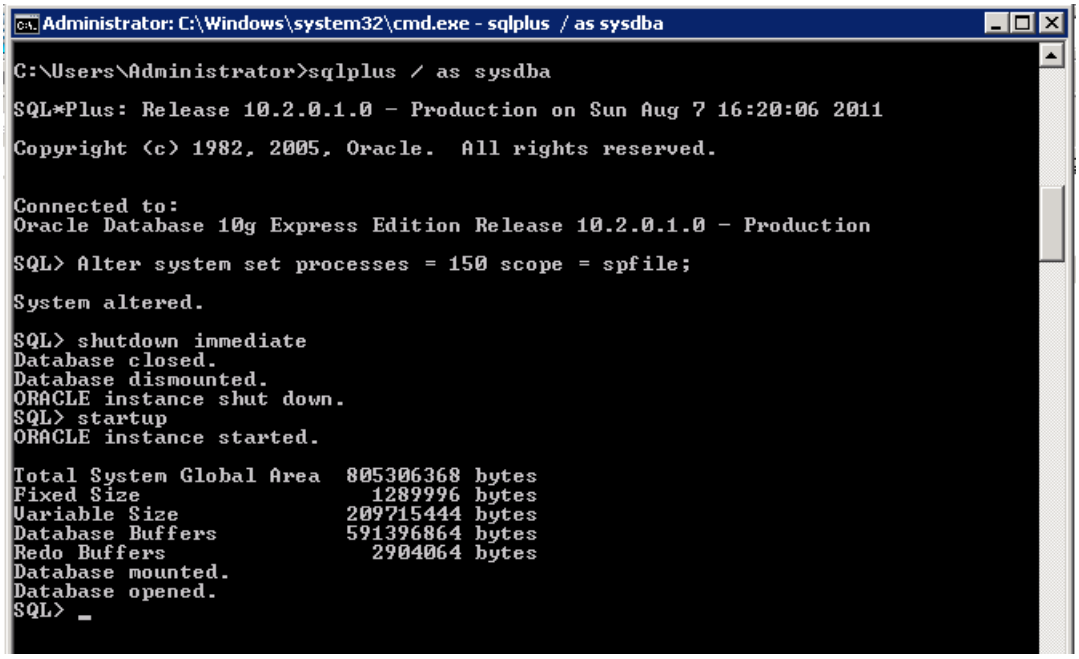

Administrator: C:\Windows\system32\cmd.exe - sqlplus / as sysdba
C:\Users\Administrator>sqlplus / as sysdba
SQL*Plus: Release 10.2.0.1.0 - Production on Sun Aug 7 16:20:06 2011
Copyright (c) 1982, 2005, Oracle. All rights reserved.
Connected to:
Oracle Database 10g Express Edition Release 10.2.0.1.0 - Production
SQL> Alter system set processes = 150 scope = spfile;
System altered.
SQL> shutdown immediate
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL> startup
ORACLE instance started.
Total System Global Area 805306368 bytes
Fixed Size 1289996 bytes
Variable Size 209715444 bytes
Database Buffers 591396864 bytes
Redo Buffers 2904064 bytes
Database mounted.
Database opened.
SQL>

Figure 2-40: sqlplus Commands

b Go back to the StarQuality installation application and click **Next**.The StarQuality Windows Service Registration window is displayed (Figure 2-39). The service will be run with the given Windows user. Fill in and confirm the required password. Use the Windows password for the same user.

11 Click **Next**; The Oracle Connection page is displayed (Figure 2-41).

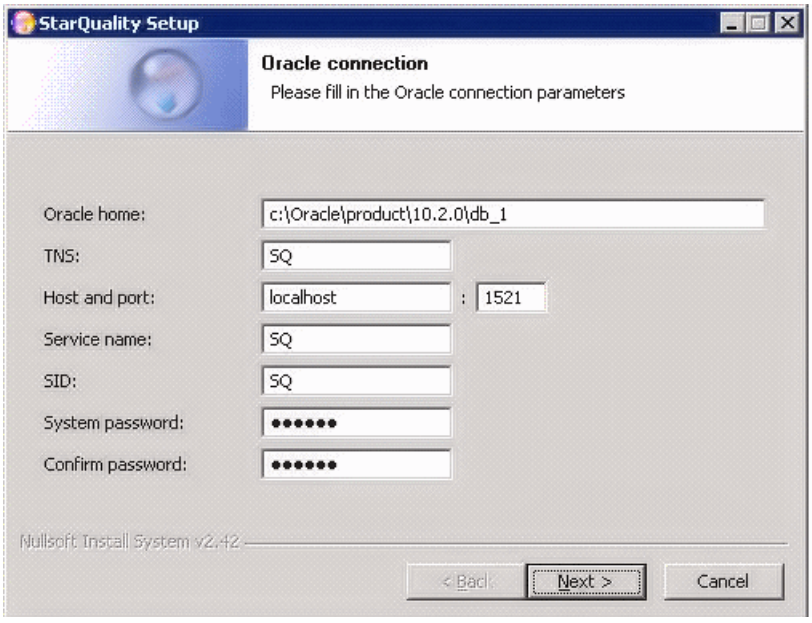


Figure 2-41: Oracle Connection Parameters

12 Enter missing parameters and verify that the correct values are filled out in the following fields:

Table 2-6: Oracle Connection Parameters

Parameter	Description	Comments
Oracle Home	The path to the Oracle Home directory.	Verify that automatic value is correct
TNS	The Transparent Network Substrate (TNS) name to be used for the database connection.	The TNS name appears in the *tnsnames.ora* file on the StarQuality machine. For internal Oracle: SQ
Host and port	The host of the Oracle database server and the port used for connecting to it.	The default port for internal oracle is 1521. Host can be any of the following: ■ localhost ■ Host name ■ IP ■ 127.0.0.1
Service name	Service name of Oracle server/client	If this value is defined do not fill in SID. For internal Oracle: SQ
SID	Service ID, in case service ID is defined in Oracle server/client	If this value is defined do not fill in Service name
System password and Confirm password	The password of the SYSTEM user in the database.	For internal Oracle: oracle.

13 Click **Next**. The Oracle Connection Tablespace parameters window is displayed. Point both CONF. and DATA tablespaces to the Oracle data computer partition, according to Table 2-2, Disk Allocation.

14 Review the creation of CONF and DATA tablespaces. If you selected the External Oracle database option, the Data tablespace size default is 2000M, and you can increase it to up to 4000M.

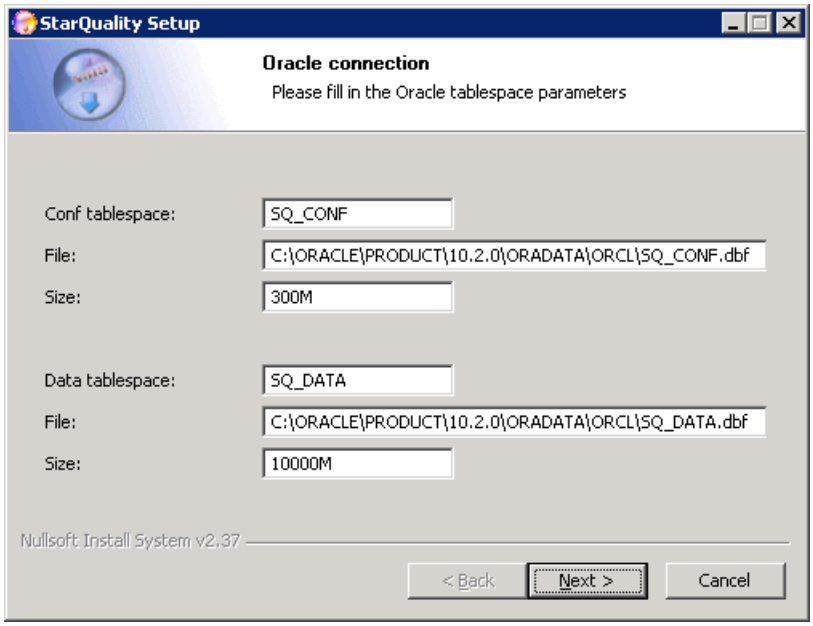


Figure 2-42: Oracle Connection - Tablespace Parameters

15 Click **Next**. The Oracle user parameters are is displayed. You can change and confirm the password.

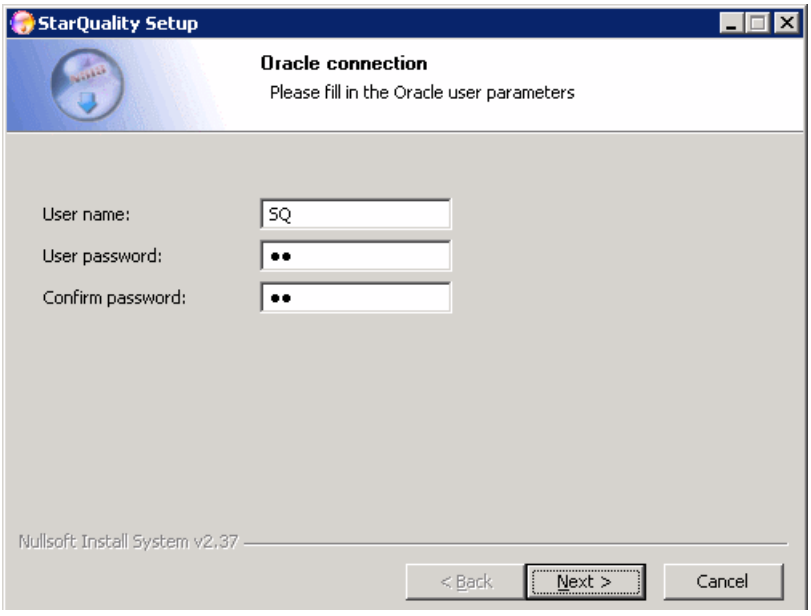


Figure 2-43: Oracle Connection - User Parameters

16 Click **Next**.The Setup wizard is displayed, prompting that the installation is complete.

Figure 2-44: StarQuality Setup Wizard - Completing Installation

17 Click **Finish** to close the wizard.

18 Set up the Oracle data files and redo logs according to the expected database size and system load. For details on these procedures, check the relevant Oracle Database documentation.

19 Load a licence and run StarQuality. Refer to:

- "Loading a StarQuality Licence" on page 105.
- "Running StarQuality on Windows" on page 105

2.4 Installation on Windows Server with Oracle Database on a Separate Machine

Before beginning the StarQuality installation refer to Table 2-1 to ensure that this is the correct installation for your system.

This installation type involves the installation of the following components:

- Oracle server on a separate machine
- Oracle client on the StarQuality machine
- cygwin
- StarQuality

The required steps are:

1. Configure network ports (Section 2.4.1.1)
2. Install Oracle server (Section 2.4.1.2)
3. Install Cygwin (Section 2.4.1.3)
4. Install StarQuality (Section 2.4.1.4)
5. Load a StarQuality license (Section 2.10.1)
6. Run StarQuality (Section 2.10.2)

2.4.1 Pre-installation Tasks

2.4.1.1 Configuring Network Ports

The following ports must be open between the server machine, client machine, managed network equipment and other NMS/OSS elements:

Table 2-7: Network Ports

Use	Port	Protocol	Direction
App. server and managed equipment	161	SNMP	Outbound towards NE
App. server, managed equipment and other NMS/OSS elements	162	SNMP	Outbound towards NMS/OSS elements
App. server and managed equipment	69	TFTP	From Managed equipment to StarQuality
App. server and client	8080		Inbound/Outbound between client and server
Oracle communication client - server	As installed (Default: 1521)		From StarQuality to Oracle and from Oracle to StarQuality
Sending requests to AlvariSTAR in order to reach KPI	16162	SNMP	
SMTP server	25	SMTP	Outbound towards SMTP server

2.4.1.2 Installing Oracle

Follow these guidelines:

- Consult Table 2-1 for the correct Oracle Server/Client versions.
- Install the Oracle Server on a standalone Oracle machine according to instructions issued by Oracle corporation. Make sure that the database is set to a minimum of 170 processes.
- Install Oracle client using the Administrator type installation.
- When completing the Oracle client installation, use the Oracle Net Configuration Assistant to create a connection to the Database server, and test it.
- During StarQuality installation, the Oracle server must be running, and the database connection from the StarQuality machine must be available.

  To test connectivity to the database server from the StarQuality machine, use the *sqlplus* utility as follows:

  a Switch to the command prompt (on Windows) or use a console (on Solaris, logged in as the Oracle user).

  b Enter the following command: `sqlplus system/oracle@testme` (assuming that the database SID is testme and the system password is oracle).
  If the SQL prompt is displayed, connectivity to the database server is confirmed. Report any error message the database administrator.

c Enter `exit` (Windows) or `quit` (Solaris) to complete the procedure.

- The following Oracle database information must be available when installing the StarQuality:
  - » Oracle Database server IP
  - » Service name (or Service ID)
  - » TNS
  - » Password for SYSTEM user

2.4.1.3 Installing Cygwin

Cygwin is a UNIX-like environment for Windows. Always use the cygwin application to run StarQuality commands.

You can download the Cygwin Installation files from the Alvarion FTP Server, or from the internet.

To install Cygwin:

1 Download Cygwin files:

» From the internet - Make sure the Cygwin version you download includes the following packages:

Sapache	base-files	base-passwd
bash	binutils	bzip2
coreutils	crypt	cygrunsrv
cygutils	cygwin	editrights
expat	findutils	gawk
gcc-core	gcc-g++	gcc-mingw-core
gcc-mingw-g++	grep	gzip
less	libbz2_1	libdb4.5
libexpat1	libexpat1-devel	libgdbm4
libiconv2	libintl3	libintl8
libncurses8	libpcre0	libpopt0
libreadline6	libwrap0	login
make	mingw-runtime	minires
openssh	openssl	perl - version 5.8.x.x

ping	sed	tar
termcap	terminfo	texinfo
tzcode	vim	w32api
which	zlib	

OR

» From Alvarion FTP server - Download the *CygwinFromWwwGoh4Com.zip* file from ftp://downloads.alvarion.com/StarSuite/Star Quality/Installations/ (Username and password are required when connecting as an Alvarion customer).

2 Extract the zip file into a folder with a path that does not include spaces.

3 From the extracted files, run the *setup.exe* file; The Cygwin Net Release Setup Program window is displayed.

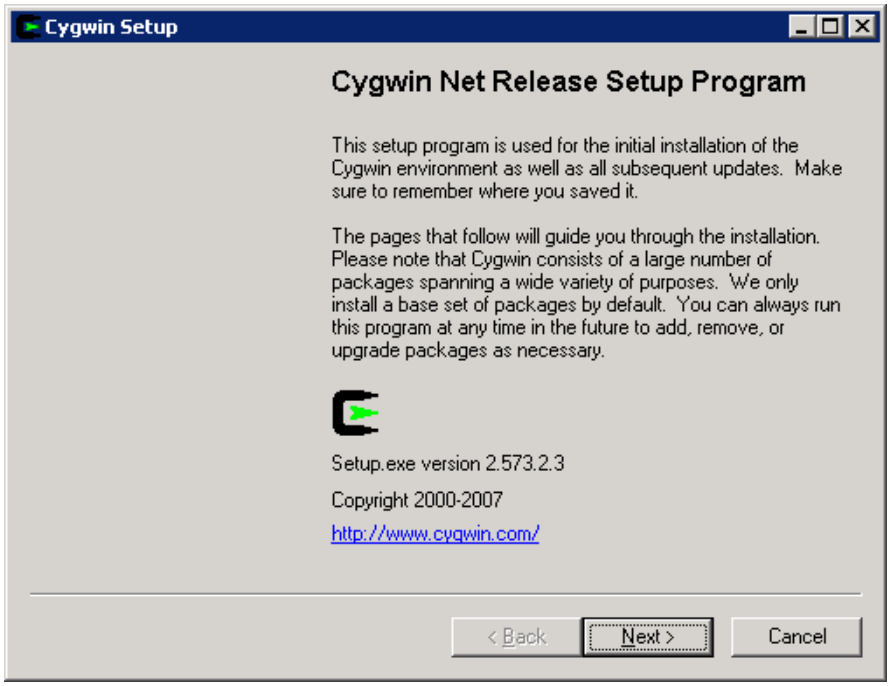

Cygwin Setup
Cygwin Net Release Setup Program
This setup program is used for the initial installation of the Cygwin environment as well as all subsequent updates. Make sure to remember where you saved it.
The pages that follow will guide you through the installation. Please note that Cygwin consists of a large number of packages spanning a wide variety of purposes. We only install a base set of packages by default. You can always run this program at any time in the future to add, remove, or upgrade packages as necessary.
Setup.exe version 2.573.2.3
Copyright 2000-2007
http://www.cygwin.com/
< Back
Next >
Cancel

Figure 2-45: Cygwin Net Release Setup Program Window

4 Click **Next**. The Choose a Download Source window is displayed.

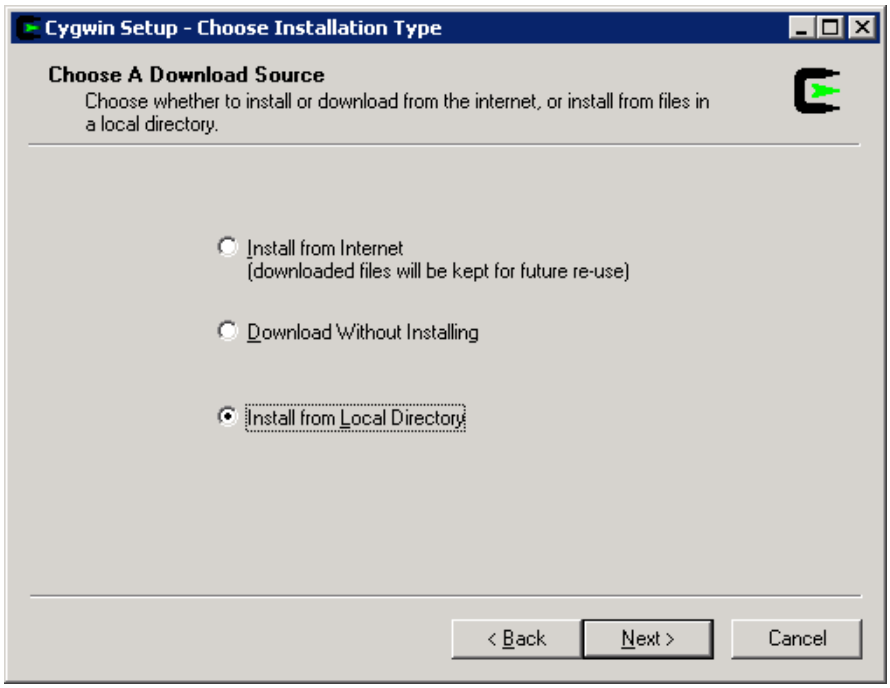

Cygwin Setup - Choose Installation Type
Choose A Download Source
Choose whether to install or download from the internet, or install from files in a local directory.
Install from Internet
(downloaded files will be kept for future re-use)
Download Without Installing
Install from Local Directory
< Back
Next >
Cancel

Figure 2-46: Choose a Download Source Window

5 Select Install from Local directory and click **Next**. The Select Root Install Directory window is displayed.

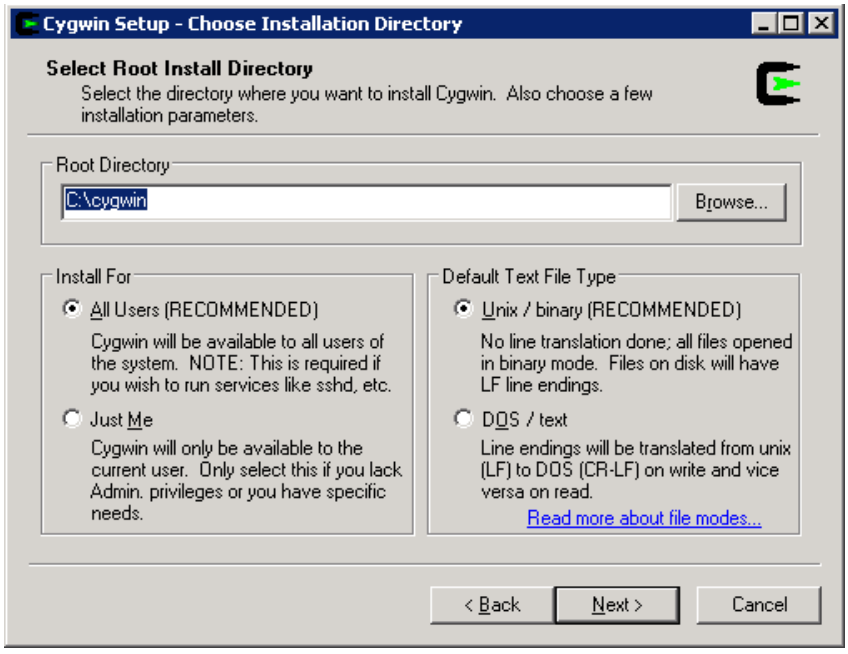

Cygwin Setup - Choose Installation Directory
Select Root Install Directory
Select the directory where you want to install Cygwin. Also choose a few installation parameters.
Root Directory
C:\cygwin
Browse...
Install For
All Users (RECOMMENDED)
Cygwin will be available to all users of the system. NOTE: This is required if you wish to run services like sshd, etc.
Just Me
Cygwin will only be available to the current user. Only select this if you lack Admin. privileges or you have specific needs.
Default Text File Type
Unix / binary (RECOMMENDED)
No line translation done; all files opened in binary mode. Files on disk will have LF line endings.
DOS / text
Line endings will be translated from unix (LF) to DOS (CR-LF) on write and vice versa on read.
Read more about file modes...
< Back
Next >
Cancel

Figure 2-47: Select Root Install Directory Window

6 Choose the default settings recommended on the screen. Verify that the Root directory is a local drive and click **Next**. The Select Local Package Directory window is displayed.

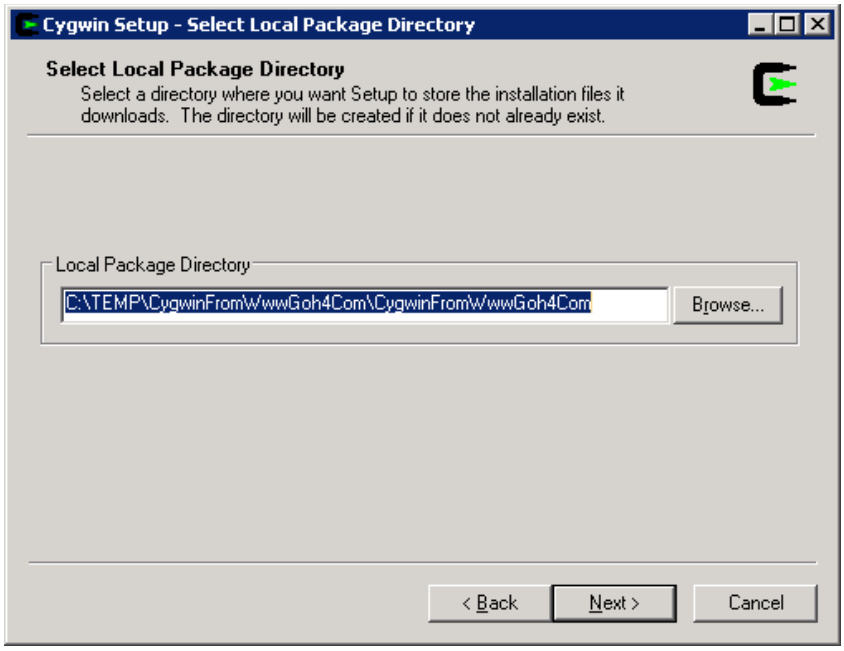

Cygwin Setup - Select Local Package Directory
Select Local Package Directory
Select a directory where you want Setup to store the installation files it downloads. The directory will be created if it does not already exist.
Local Package Directory
C:\TEMP\CygwinFromWwwGoh4Com\CygwinFromWwwGoh4Com
Browse...
< Back
Next >
Cancel

Figure 2-48: Select Local Package Directory Window

7 Verify that the path to the Local Package Directory is correct and click **Next**. The Select Packages window is displayed.

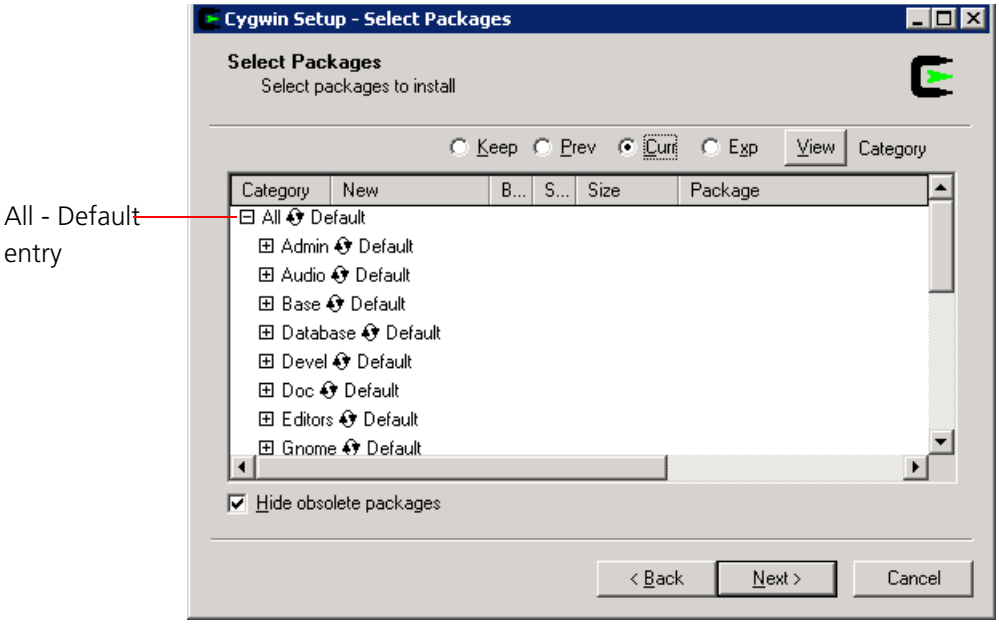


Figure 2-49: Select Packages Window - All Default (Initial State)

8 Click on the word “Default” in the main “All” entry (package) (see Figure 2-6) and change it to “Install”.

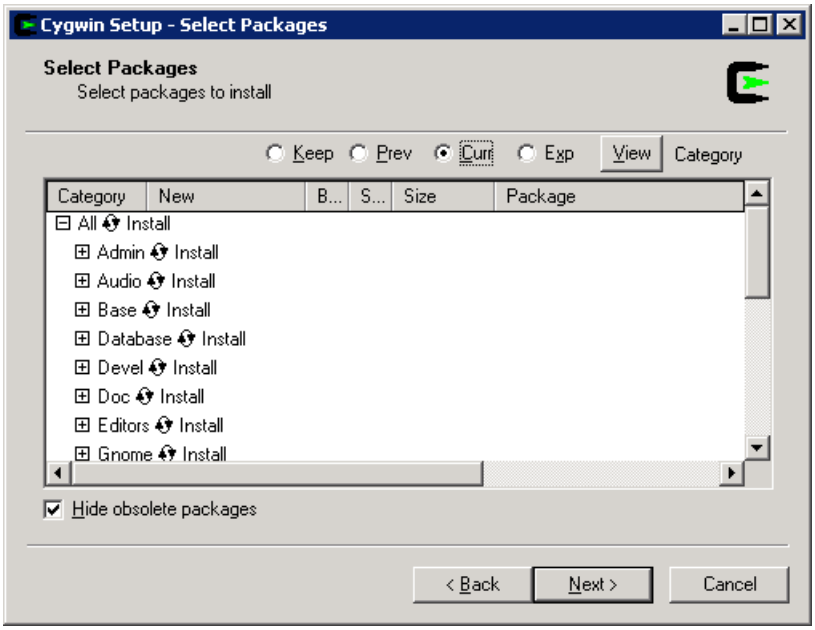


Figure 2-50: Select Packages Window - All “Install”

9 Verify that all the entries under the “All” main package have also been changed to “Install”. If not, change them.

10 Scroll down to the Perl package and expand it by clicking on the + sign.

11 Check the sub-package under Perl. If it is different than 5.8.x.x (e.g. “skip”), click on it to change it to the required 5.8.x.x.

INFORMATION

The Perl version must be 5.8.x.x, otherwise it does not meet the StarQuality requirements. If you have a different Perl version, use a different cygwin installation package.

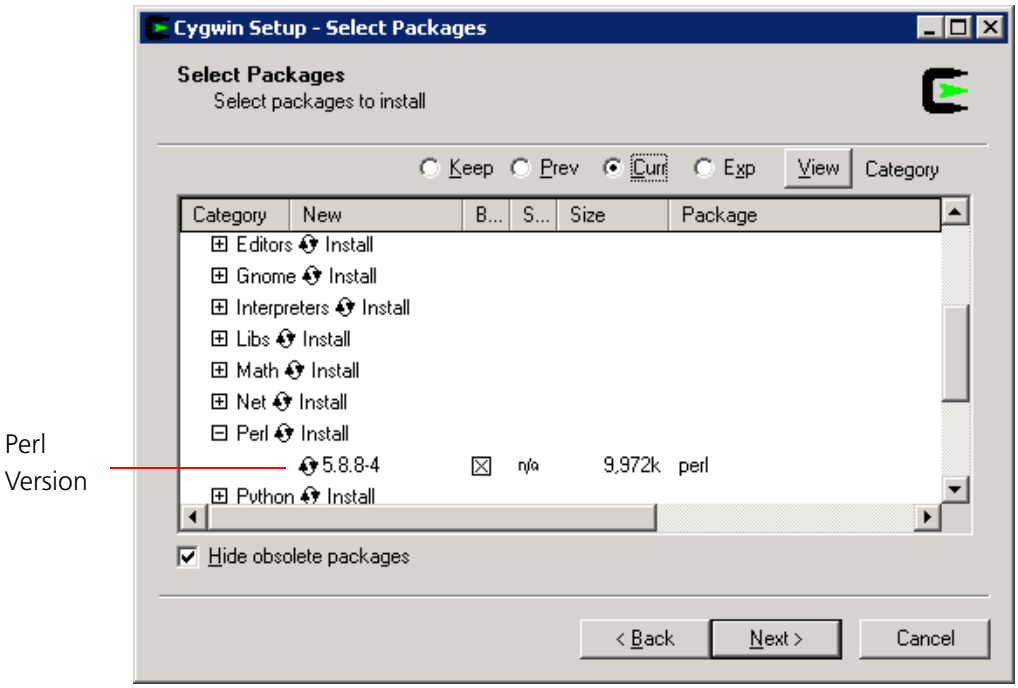


Figure 2-51: Select Packages Window - Perl Version

12 Click **Next**. The installation procees starts.

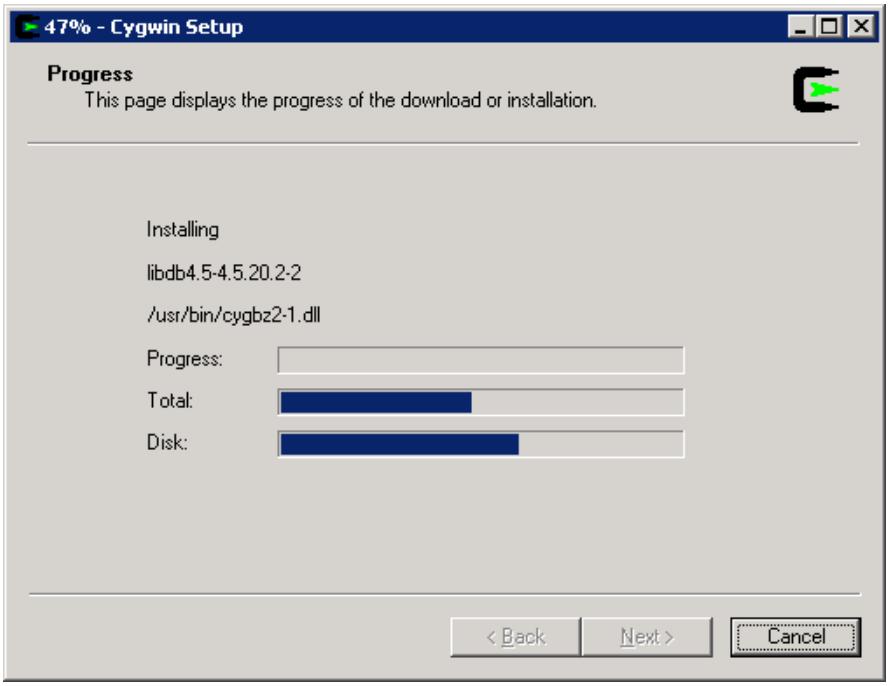


Figure 2-52: Cygwin Installation Process

13 Click **Finish**.

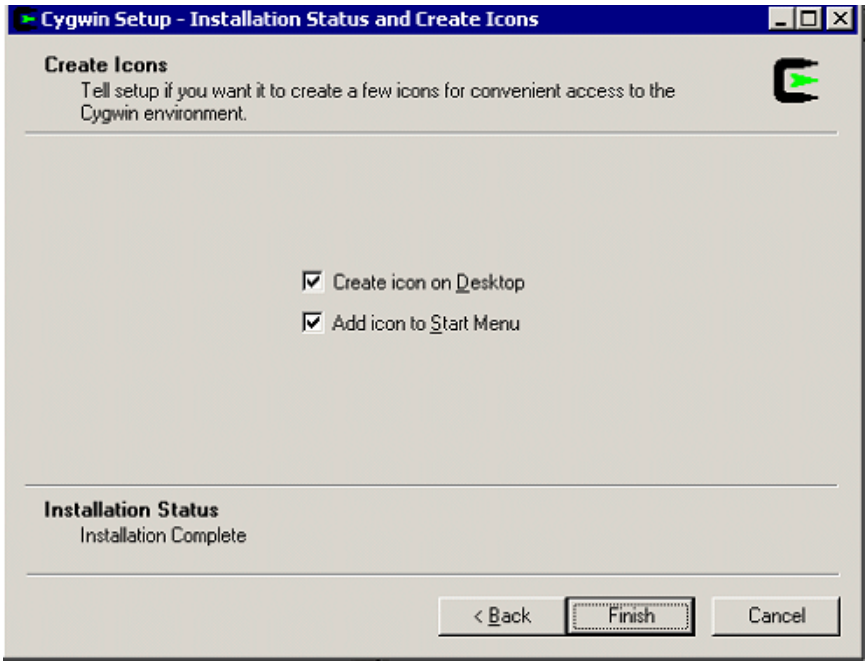

Cygwin Setup - Installation Status and Create Icons
Create Icons
Tell setup if you want it to create a few icons for convenient access to the Cygwin environment.
Create icon on Desktop
Add icon to Start Menu
Installation Status
Installation Complete
< Back
Finish
Cancel

Figure 2-53: Cygwin Installation Completion

2.4.1.4 Installing StarQuality

2.4.1.5 Overview

This Installation type is applicable when installing StarQuality on Windows server with Oracle database on a separate machine (refer to Table 2-1).

The installation must be performed by a local administrator user.

During the installation, the installer writes information into two destinations: the Details view and the log file. To display the Details view, click **Show Details** in the installation wizard. The log file is located in the *Temp* directory of the user (by default *C:\Documents and Settings\<USER>\Local Settings\Temp*).

2.4.1.6 Procedure

1 Ensure that the pre-installation tasks are complete as required in Section 2.4.1.

2 Do one of the following:

» Insert the installation DVD into the DVD drive and copy the Installation folder directly onto one of the disk drives (for example: *C:*).

NOTE!

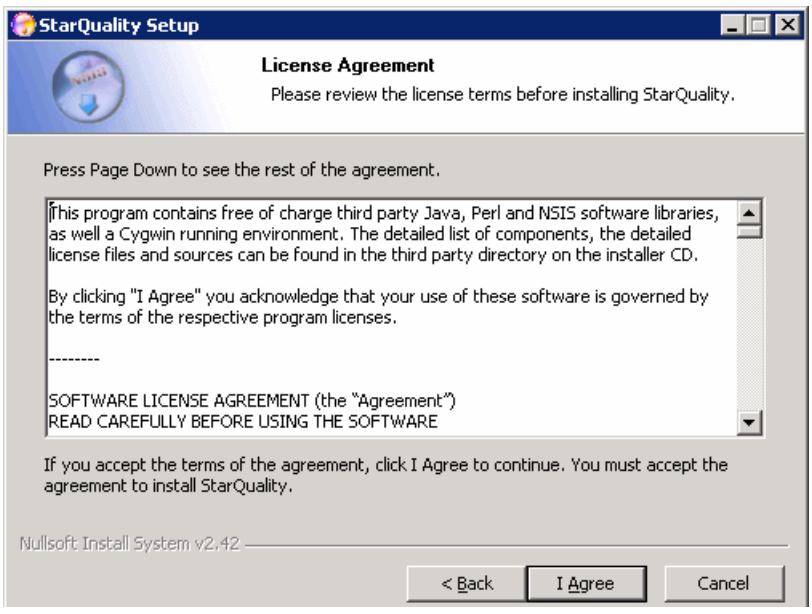
Do not place the installation files into a folder with a long path. This is an Oracle installer limitation.

3 Run the installation program *starquality.exe*. The installation wizard is displayed.

StarQuality Setup
Welcome to the StarQuality Setup Wizard
This wizard will guide you through the installation of StarQuality.
It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.
Click Next to continue.
Next >
Cancel

Figure 2-54: StarQuality Setup Wizard Window

4 Click **Next**. The wizard displays the license agreement. Read the agreement carefully.


StarQuality Setup
License Agreement
Please review the license terms before installing StarQuality.
Press Page Down to see the rest of the agreement.
This program contains free of charge third party Java, Perl and NSIS software libraries, as well a Cygwin running environment. The detailed list of components, the detailed license files and sources can be found in the third party directory on the installer CD.
By clicking "I Agree" you acknowledge that your use of these software is governed by the terms of the respective program licenses.

SOFTWARE LICENSE AGREEMENT (the "Agreement")
READ CAREFULLY BEFORE USING THE SOFTWARE
If you accept the terms of the agreement, click I Agree to continue. You must accept the agreement to install StarQuality.
Nullsoft Install System v2.42
< Back
I Agree
Cancel

Figure 2-55: Licence Agreement

5 Click **I Agree**. The wizard displays components to install.

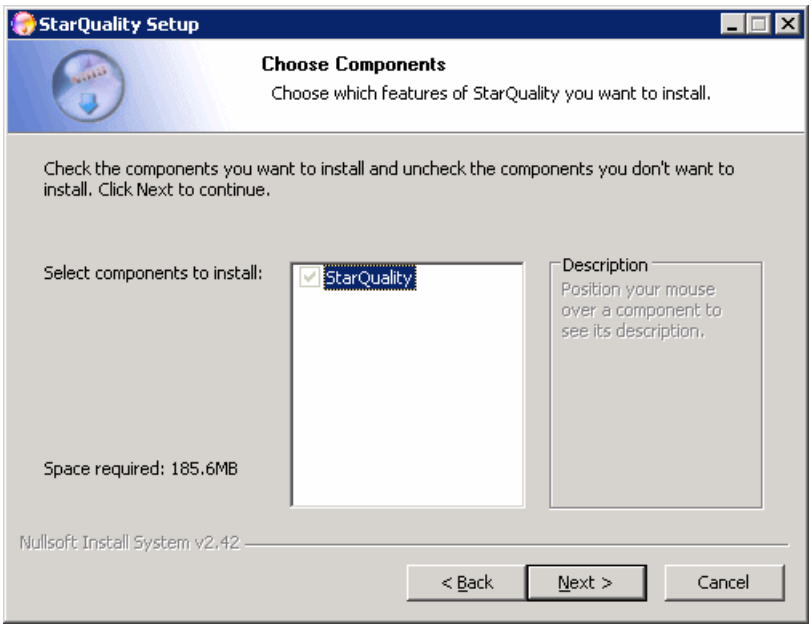

StarQuality Setup
Choose Components
Choose which features of StarQuality you want to install.
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select components to install:
StarQuality
Description
Position your mouse over a component to see its description.
Space required: 185.6MB
Nullsoft Install System v2.42
< Back
Next >
Cancel

Figure 2-56: Choose Components

6 Click **Next**. The StarQuality installation starts. To view detailed information, click **Show Details**. You can copy the content of the details view for reference.

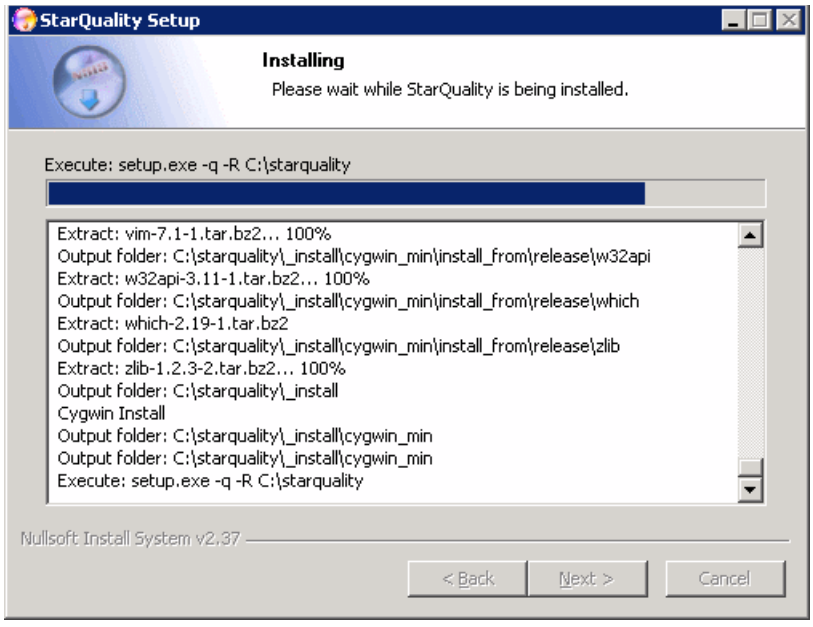


Figure 2-57: StarQuality Installing

The last page indicates that the basic installation is complete.

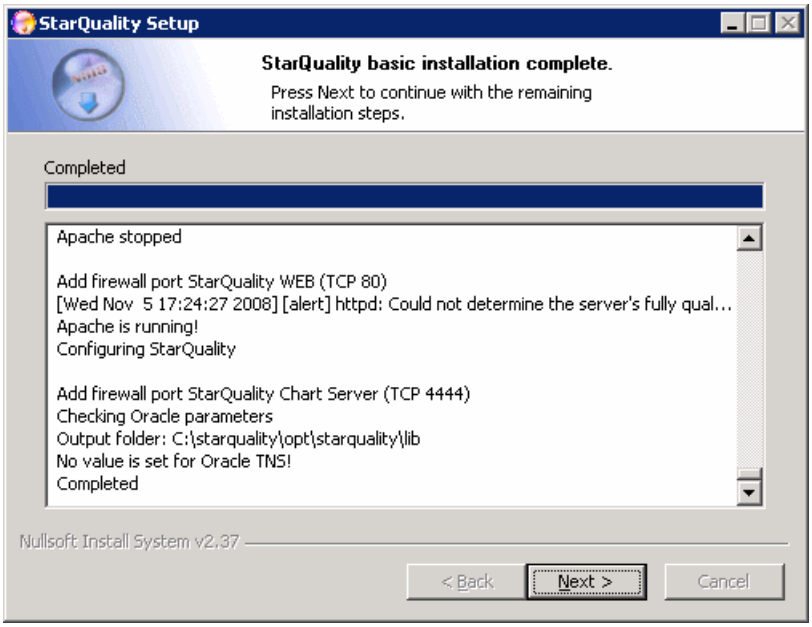

StarQuality Setup
StarQuality basic installation complete.
Press Next to continue with the remaining installation steps.
Completed
Apache stopped
Add firewall port StarQuality WEB (TCP 80)
[Wed Nov 5 17:24:27 2008] [alert] httpd: Could not determine the server's fully qual...
Apache is running!
Configuring StarQuality
Add firewall port StarQuality Chart Server (TCP 4444)
Checking Oracle parameters
Output folder: C:\starquality\opt\starquality\lib
No value is set for Oracle TNS!
Completed
Nullsoft Install System v2.37
< Back
Next >
Cancel

Figure 2-58: StarQuality Basic Installation Complete

7 Click **Next**. The StarQuality Service Registration window is displayed. Enter and confirm the required password. Use the Windows password for the same user.

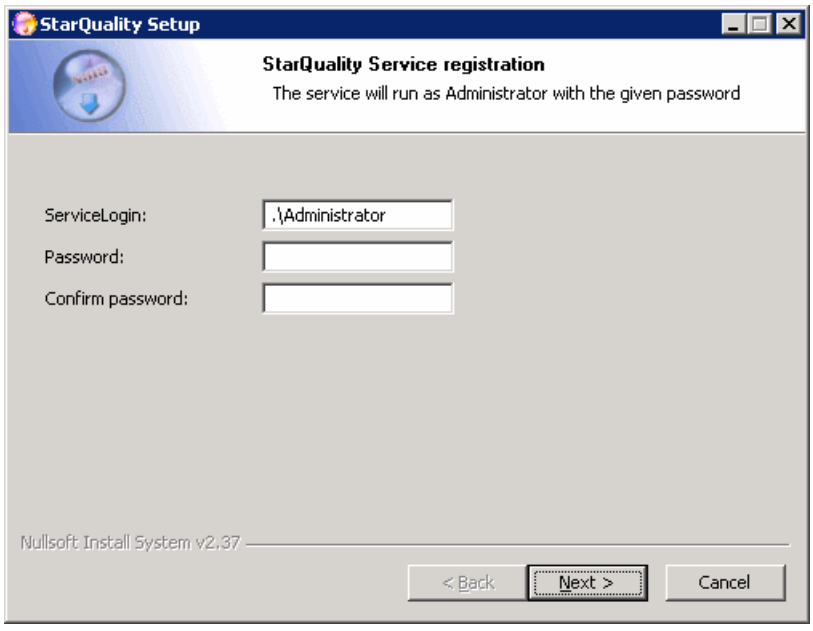


Figure 2-59: StarQuality Windows Service Registration

8 Click **Next**; The Oracle Connection page is displayed.

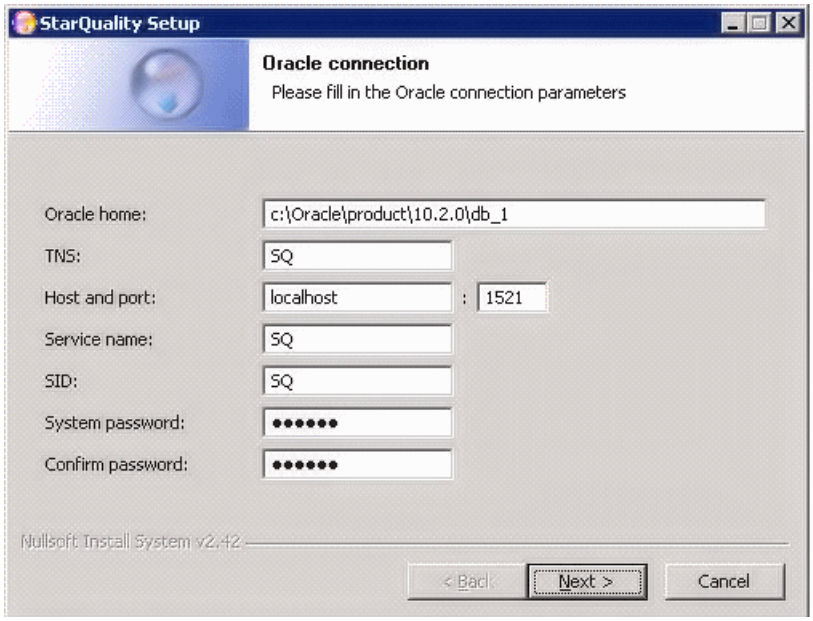


Figure 2-60: Oracle Connection Parameters

9 Enter missing parameters and verify that the correct values are filled out in the following fields:

Table 2-8: Oracle Connection Parameters

Parameter	Description	Comments
Oracle Home	The path to the Oracle Client Home variable on the StarQuality machine.	Verify that automatic value is correct
TNS	The Transparent Network Substrate (TNS) name to be used for the database connection.	The TNS name appears in the *tnsnames.ora* file on the StarQuality machine.
Host and port	IP of the Oracle database server and the port used for connecting to it.	The default port is 1521.
Service name	Service name of Oracle server/client	If this value is defined, do not fill in SID. For internal Oracle: SQ
SID	Service ID, in case service ID is defined in Oracle server/client	If this value is defined, do not fill in Service name
System password and Confirm password	The password of the SYSTEM user in the database.	For internal Oracle: oracle.

10 Click **Next**. The Oracle Connection Tablespace parameters are displayed. Point both CONF. and DATA tablespaces to the Oracle data computer partition according to Table 2-2, Disk Allocation.

11 Review the creation details of CONF and DATA tablespaces.

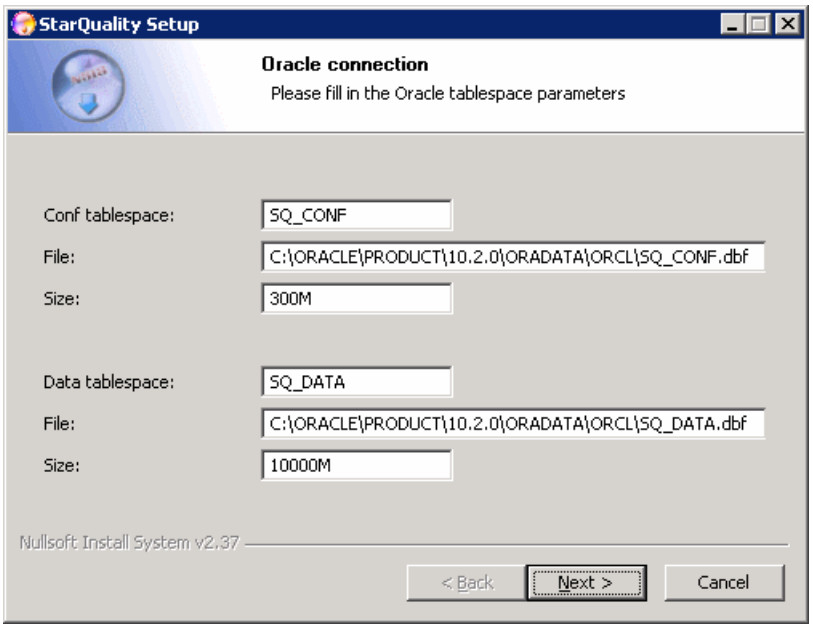


Figure 2-61: Oracle Connection - Tablespace Parameters

12 Click **Next**. The Oracle user parameters are displayed. You can change and confirm the password.

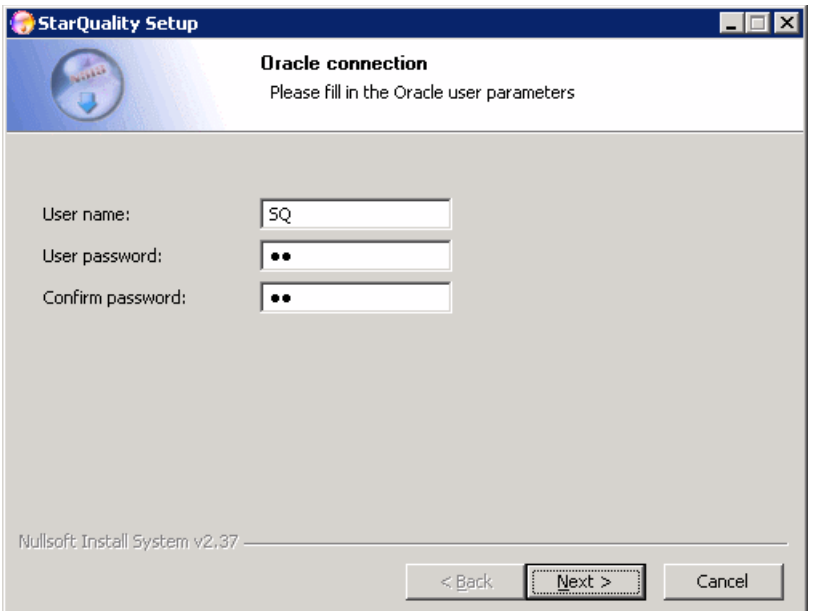


Figure 2-62: Oracle Connection - User Parameters

13 Click **Next**; The Setup wizard is displayed, prompting that the installation is complete.

Figure 2-63: StarQuality Setup Wizard - Completing Installation

14 Click **Finish** to close the wizard.

15 Set up the Oracle data files and redo logs according to the expected database size and system load. For details on these procedures, check the relevant Oracle Database documentation.

16 Load a licence and run StarQuality. Refer to:

- "Loading a StarQuality Licence" on page 105.
- "Running StarQuality on Windows" on page 105

2.5 Installation on Solaris Server with Internal Oracle Database

Before beginning the StarQuality installation, refer to Table 2-1 to ensure that this is the correct installation for your system. Check that you have performed all the tasks outlined in Section 2.5.1 below.

This installation type involves configuration of the Solaris kernel parameters and then installation of StarQuality.

The required steps are:

1. Configure Kernel Parameters for Solaris x86 (Section 2.5.1.1)
2. Configure network ports (Section 2.5.1.2)
3. Install StarQuality (Section 2.5.2)
4. Run StarQuality (Section 2.10.3)

2.5.1 Pre-installation Tasks

2.5.1.1 Configuring Kernel Parameters for Solaris x86

1. Add the following entries to the */etc/system* file and reboot the system:

```
set shmsys:shminfo_shmmax=4294967295
set shmsys:shminfo_shmmni=100
set semsys:seminfo_semmni=100
set semsys:seminfo_semmsl=256
```

2. Verify that there is a minimum of 10 GB swap space

2.5.1.2 Configuring Network Ports

The following ports must be open between the server machine, client machine, managed network equipment and other NMS/OSS elements:

Table 2-9: Network Ports

Use	Port	Protocol	Direction
App. server and managed equipment	161	SNMP	Outbound towards NE
App. server, managed equipment and other NMS/OSS elements	162	SNMP	Outbound towards NMS/OSS elements
App. server and managed equipment	69	TFTP	From Managed equipment to StarQuality
App. server and client	8080		Inbound/Outbound between client and server
Sending requests to AlvariSTAR in order to reach KPI	16162	SNMP	
SMTP server	25	SMTP	Outbound towards SMTP server

2.5.2 Installing StarQuality

StarQuality can be installed on a Solaris 10 x86 operating system using the command-line installer.

All operations must be done while logged in as *root* user.

To install StarQuality:

1. Run the installer application, *StarQuality.v3.0.en.bin*, either directly from the installation DVD or from a directory to which the file was transferred (using FTP).
2. The following sections describe the installation process and details.

2.5.2.1 Basic Checks

The installer checks the following details:

- Version of the operating system
- Required packages
- Version of Perl and the options used to build the Perl binary

If the application detects an error during these checks, then depending on the level of error, it either immediately terminates or asks whether it should continue or not. Always answer No and restart the installation.

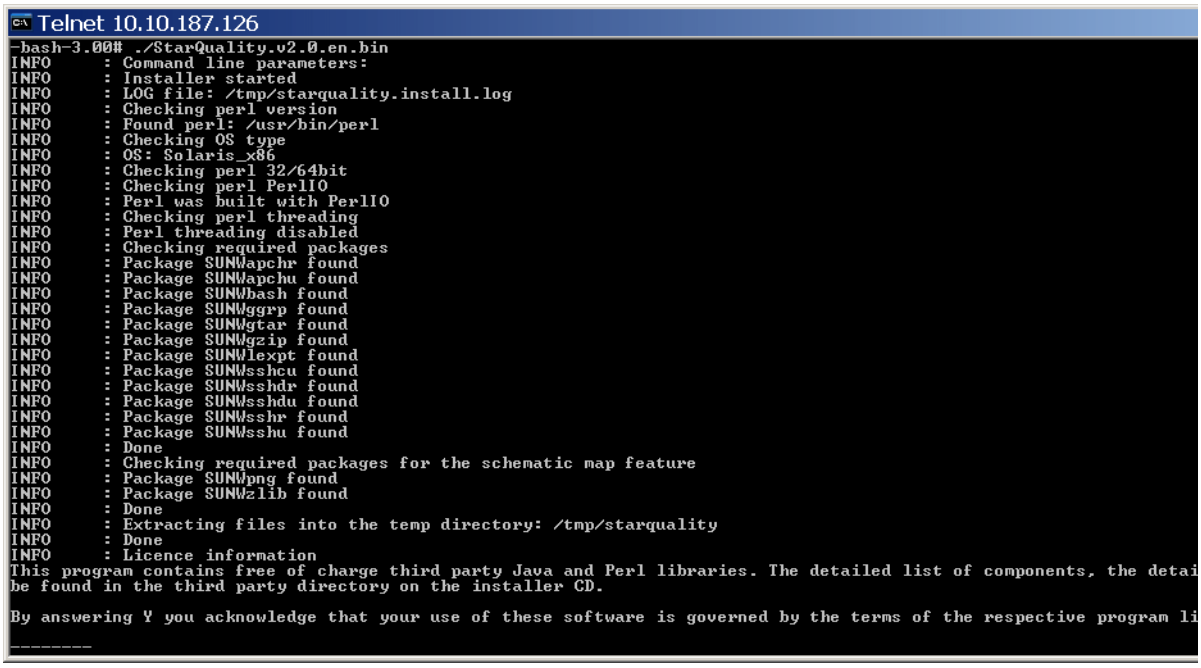

Telnet 10.10.187.126
-bash-3.00# ./StarQuality.v2.0.en.bin
INFO : Command line parameters:
INFO : Installer started
INFO : LOG file: /tmp/starquality.install.log
INFO : Checking perl version
INFO : Found perl: /usr/bin/perl
INFO : Checking OS type
INFO : OS: Solaris_x86
INFO : Checking perl 32/64bit
INFO : Checking perl PerlIO
INFO : Perl was built with PerlIO
INFO : Checking perl threading
INFO : Perl threading disabled
INFO : Checking required packages
INFO : Package SUNWapchr found
INFO : Package SUNWapchu found
INFO : Package SUNWbash found
INFO : Package SUNWggrp found
INFO : Package SUNWgtar found
INFO : Package SUNWgzip found
INFO : Package SUNWlexpt found
INFO : Package SUNWsshcu found
INFO : Package SUNWsshdr found
INFO : Package SUNWsshdu found
INFO : Package SUNWsshr found
INFO : Package SUNWsshu found
INFO : Done
INFO : Checking required packages for the schematic map feature
INFO : Package SUNWpng found
INFO : Package SUNWzlib found
INFO : Done
INFO : Extracting files into the temp directory: /tmp/starquality
INFO : Done
INFO : Licence information
This program contains free of charge third party Java and Perl libraries. The detailed list of components, the detai
be found in the third party directory on the installer CD.
By answering Y you acknowledge that your use of these software is governed by the terms of the respective program li
----

Figure 2-64: Installation on Solaris - Basic Checks

2.5.2.2 License Information

When the basic checks are complete, the license agreement is displayed. To scroll down the agreement, press either the spacebar or the Enter key.

Read the agreement carefully before accepting.

2.5.2.3 Installing the Embedded Oracle Database

The application prompts for the operating system user utilized during the Oracle installation. This part can take up to 30 minutes depending on the computer characteristics. After providing it, the application tries to find an Oracle user on the machine. Only if such a user does not exist, will the installer prompt for installing the internal Oracle database.

Select Telnet 10.10.187.117
elief, in addition to all other remedies that may be available, in law, at equit
y or otherwise.
If you have any questions concerning this Agreement, please contact us at: http:
//www.alvarion.com.
ATT: Legal Department
E-mail: legal@alvarion.com
QUESTION : Do you agree to the licence terms (Y/N) []: y
INFO : The perl /usr/bin/perl is the same as the /usr/local/bin/perl
QUESTION : The OS user of Oracle [oracle]:
INFO : Oracle user oracle doesn't exist
QUESTION : Do you want to install Oracle? (Y/N) [N]: y
INFO : Embeded Oracle install supported
QUESTION : Please specify Oracle 10 installer directory!
The directory have to contains both setup and patch:
install_directory/
10201_database_solx86_64/database/runInstaller
p6810189_10204_Solaris86-64/Disk1/runInstaller
[/tmp/sq2.5/Setup/db]: /export/home/downloads/sq2.5/Setup/db
QUESTION : Please specifie Oracle home directory! [/export/home/oracle]:
INFO : ora_config_file: /tmp/starquality/scripts_deploy/oraparam.properties
./StarQuality.v2.5.4.en.bin: line 2639: /tmp/starquality/scripts_deploy/oraparam
.properties=/var/starquality/oraparam.properties: No such file or directory
INFO : Oracle install configuration file: /tmp/starquality/scripts_deploy/or
aparam.properties
INFO : Oracle install step: USER_ADD (start:Wednesday, June 2, 2010 12:32:1
6 PM IDT)
LOGDIR=/tmp/starquality/log/create_group
RC=SUCCESS
LOGDIR=/tmp/starquality/log/oracle_dir
RC=SUCCESS
INFO : Oracle install step: USER_ADD (finished:Wednesday, June 2, 2010 12:3
2:19 PM IDT)
INFO : Oracle install step: SETUP_ADD (start:Wednesday, June 2, 2010 12:32:
19 PM IDT)
Sun Microsystems Inc. SunOS 5.10 Generic January 2005
Starting Oracle Universal Installer...
Checking installer requirements...
Checking operating system version: must be 5.10. Actual 5.10
Passed
Checking Temp space: must be greater than 250 MB. Actual 7741 MB Passed
Checking swap space: must be greater than 500 MB. Actual 8049 MB Passed
All installer requirements met.
Preparing to launch Oracle Universal Installer from /tmp/OraInstall2010-06-02_12
-32-20PM. Please wait ...Oracle Universal Installer, Version 10.2.0.1.0 Producti
on
Copyright (C) 1999, 2005, Oracle. All rights reserved.
You can find a log of this install session at:
/export/home/oracle/oraInventory/logs/installActions2010-06-02_12-32-20PM.log

Figure 2-65: Installing Embedded Oracle Database

Set up the Oracle data files and redo logs according to the expected database size and system load. For details on these procedures, check the relevant Oracle Database documentation.

2.5.2.4 StarQuality Installation Prompts

The application prompts for the following:

- Operating system user name to be created
- Operating system group to be created
- Directory below the */opt* directory to be used by StarQuality,

- Profile file to be used
- Type of StarQuality installation

If the user and the directory already exist, but the installer cannot find a valid StarQuality installation in the directory, then it asks whether it should continue or not. If it finds a StarQuality instance, it stops until all StarQuality modules are stopped.

The installer prompts for the installation type, that is, if you are installing an additional server. Answer No to this prompt.

```
------------------------------------------------------------------------
WARNING: !!! YOU SHOULD ONLY ANSWER YES TO THE FOLLOWING QUESTION!!!
WARNING: !!! IF YOU ARE INSTALLING AN ADDITIONAL (COLLECTOR) SERVER !!!
WARNING: !!! OR YOU ARE UPGRADING SUCH AN ADDITIONAL (COLLECTOR) SERVER !!!
QUESTION : Are you installing a collector server (Y/N) [N]:
QUESTION : Do you want to configure the Apache WEB server (Y/N) [Y]: y
INFO : Configuring Apache
QUESTION : On which port should Apache listen [80]:
QUESTION : Where is the Apache apachectl file [/usr/apache/bin/apachectl]:
QUESTION : Where is the Apache htpasswd file [/usr/apache/bin/htpasswd]:
QUESTION : Where is the Apache pid file [/var/run/apache/httpd.pid]:
QUESTION : Where is the Apache httpd.conf file [/etc/apache/httpd.conf]:
INFO : Creating backup /etc/apache/httpd.conf.20090512-122852 from
/etc/apache/httpd.conf
INFO : Stopping Apache
INFO : Creating a new /etc/apache/httpd.conf
INFO : Starting Apache
INFO : Creating the service script, so the operating system can automatically
INFO : start and stop StarQuality
WARNING  : !!! YOU SHOULD ONLY ANSWER YES TO THE FOLLOWING QUESTION IF !!!
WARNING  : !!! THE ORACLE DATABASE RUNS ON THIS SERVER AND YOU DO NOT  !!!
WARNING  : !!! HAVE ALREADY A START/STOP SCRIPT FOR THE ORACLE !!!
QUESTION : Should this script start/stop the Oracle server as well (Y/N) [Y]: n
WARNING  : !!! IF THE ORACLE RUNS ON THIS SERVER THEN MAKE SURE THAT   !!!
WARNING  : !!! IT STARTS BEFORE THE APPLICATION AND STOPS AFTER THE!!!
WARNING  : !!! APPLICATION !!!
```

```
INFO : Creating sym link /etc/rc0.d/K01starquality

INFO : Creating sym link /etc/rc3.d/S99starquality

-------------------------------------------------------------------------
```

2.5.2.5 Creating the StarQuality Tablespaces in the Database and the Oracle User

The installer prompts for the following, and creates the tablespaces:

- Name, file name and size parameters for its configuration and data tablespaces. Leave name and size as prompted, but point to the partition as defined in the required Partitioning table.
- Name and password for its Oracle user.

```
-------------------------------------------------------------------------

INFO : Checking Oracle schema

INFO : Getting the default tablespace directory

QUESTION : StarQuality Conf tablespace name [SQ_CONF]:

QUESTION : StarQuality Conf tablespace file
[/export/home/oracle/oradata/SQ/SQ_CONF.dbf]:

QUESTION : StarQuality Conf tablespace size [300M]:

INFO : Creating the tablespace SQ_CONF, this could take several minutes

INFO : Oracle tablespace SQ_CONF created

QUESTION : StarQuality Data tablespace name [SQ_DATA]:

QUESTION : StarQuality Data tablespace file
[/export/home/oracle/oradata/SQ/SQ_DATA.dbf]:

QUESTION : StarQuality Data tablespace size [10000M]:

INFO : Creating the tablespace SQ_DATA, this could take several minutes

INFO : Creating the tablespace SQ_DATA, this could take several minutes

INFO : Oracle tablespace SQ_DATA created

QUESTION : StarQuality Oracle user name [SQ]:

QUESTION : StarQuality Oracle user password [******]:

INFO : Creating the Oracle schema, this could take several minutes

INFO : Oracle user SQ created

-------------------------------------------------------------------------
```

2.5.2.6 Finishing the Installation

1 The installer generates the schematic maps and exits.

```
-------------------------------------------------------------------------
INFO : Redrawing schematic maps
INFO : Installer ended
-bash-3.00#
-------------------------------------------------------------------------
```

2 To load a licence and run StarQuality, refer to:

- "Running StarQuality on Solaris" on page 108
- "Configuration Parameters" on page 109

2.6 Installation on Solaris Server with External Oracle Database on the Same Machine

Before beginning the StarQuality installation refer to Table 2-1 to ensure that this is the correct installation for your system.

This installation type involves configuration of the Solaris kernel parameters and the installation of the following components:

- Oracle server (Oracle client is not required)
- StarQuality

The required steps are:

1. Configure Kernel Parameters for Solaris x86 (Section 2.6.1.1)
2. Configure network ports (Section 2.6.1.2)
3. Install the Oracle server (Section 2.6.1.3)
4. Install StarQuality (Section 2.6.2)
5. Run StarQuality (Section 2.10.3)

2.6.1 Pre-installation Tasks

2.6.1.1 Configuring Kernel Parameters for Solaris x86

1. Add the following entries to the */etc/system* file and reboot the system:

```
set shmsys:shminfo_shmmax=4294967295
set shmsys:shminfo_shmmni=100
set semsys:seminfo_semmni=100
set semsys:seminfo_semmsl=256
```

2. Verify that there is a minimum of 10 GB swap space

2.6.1.2 Configuring Network Ports

The following ports must be open between the server machine, client machine, managed network equipment and other NMS/OSS elements:

Table 2-10: Network Ports

Use	Port	Protocol	Direction
App. server and managed equipment	161	SNMP	Outbound towards NE
App. server, managed equipment and other NMS/OSS elements	162	SNMP	Outbound towards NMS/OSS elements
App. server and managed equipment	69	TFTP	From Managed equipment to StarQuality
App. server and client	8080		Inbound/Outbound between client and server
Sending requests to AlvariSTAR in order to reach KPI	16162	SNMP	
SMTP server	25	SMTP	Outbound towards SMTP server

2.6.1.3 Installing the Oracle Server

Follow these guidelines:

- Consult Table 2-1 for the correct Oracle Server version.
- Install the Oracle Server according to instructions issued by Oracle corporation.
- Make sure that the database is set to a minimum of 170 processes.
- Set up the Oracle data files and redo logs according to the expected database size and system load. For details on these procedures, check the relevant Oracle Database documentation.
- During StarQuality installation, the Oracle server must be running, and the database connection from the StarQuality machine must be available.

  To test connectivity to the database server from the StarQuality machine, use the *sqlplus* utility as follows:

  a Switch to the command prompt (on Windows) or use a console (on Solaris, logged in as the Oracle user).

  b Enter the following command: `sqlplus system/oracle@testme` (assuming that the database SID is testme and the system password is oracle).
  If the SQL prompt is displayed, connectivity to the database server is confirmed. Report any error message the database administrator.

  c Enter `exit` (Windows) or `quit` (Solaris) to complete the procedure.

- The following Oracle database information must be available when installing StarQuality:
  - Service name (or Service ID)
  - TNS (Transparent Network Substrate)
  - Password for SYSTEM user

2.6.2 Installing StarQuality

StarQuality can be installed on a Solaris 10 x86 operating system using the command-line installer.

All operations should be done while logged in as *root* user.

To install StarQuality (Solaris):

1. Run the installer application, *StarQuality.v3.0.en.bin*, either directly from the installation DVD or from a directory to which the file was transferred (using FTP).
2. Follow the next sections for installation details.

2.6.2.1 Basic Checks

The installer checks the following details:

- Version of the operating system
- Required packages
- Version of Perl and the options used to build the Perl binary

If the application detects an error during these checks, then, depending on the level of error, it either immediately terminates or asks whether it should continue or not. Always answer No and restart the installation.

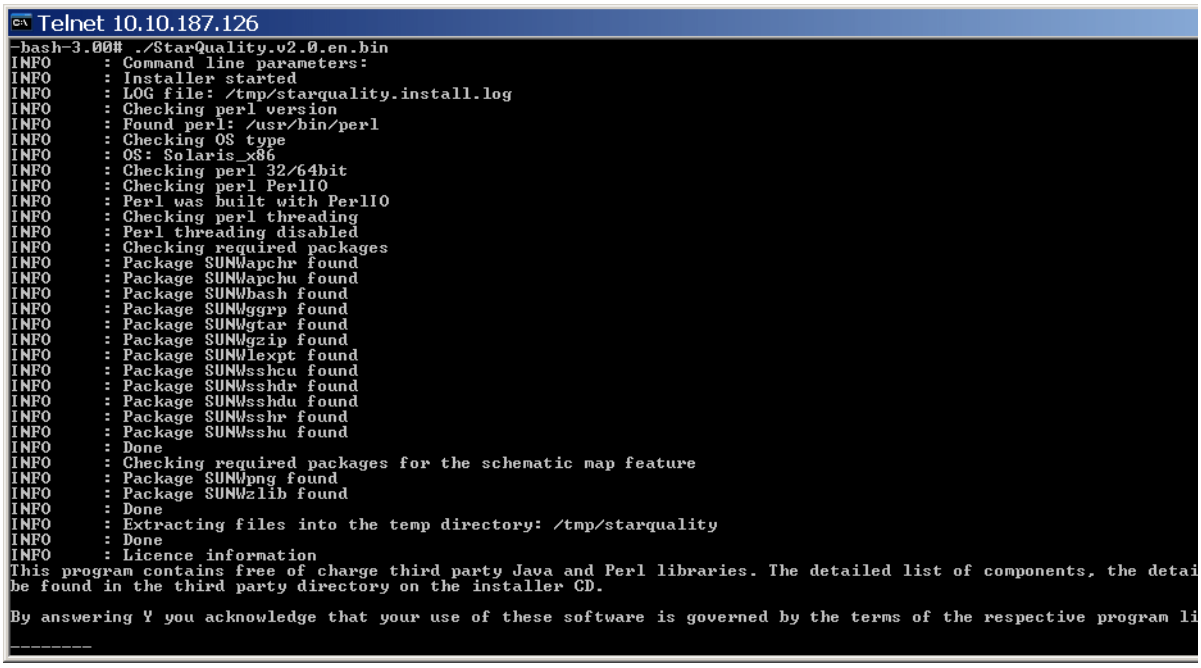

Telnet 10.10.187.126
-bash-3.00# ./StarQuality.v2.0.en.bin
INFO : Command line parameters:
INFO : Installer started
INFO : LOG file: /tmp/starquality.install.log
INFO : Checking perl version
INFO : Found perl: /usr/bin/perl
INFO : Checking OS type
INFO : OS: Solaris_x86
INFO : Checking perl 32/64bit
INFO : Checking perl PerlIO
INFO : Perl was built with PerlIO
INFO : Checking perl threading
INFO : Perl threading disabled
INFO : Checking required packages
INFO : Package SUNWapchr found
INFO : Package SUNWapchu found
INFO : Package SUNWbash found
INFO : Package SUNWggrp found
INFO : Package SUNWgtar found
INFO : Package SUNWgzip found
INFO : Package SUNWlexpt found
INFO : Package SUNWsshcu found
INFO : Package SUNWsshdr found
INFO : Package SUNWsshdu found
INFO : Package SUNWsshr found
INFO : Package SUNWsshu found
INFO : Done
INFO : Checking required packages for the schematic map feature
INFO : Package SUNWpng found
INFO : Package SUNWzlib found
INFO : Done
INFO : Extracting files into the temp directory: /tmp/starquality
INFO : Done
INFO : Licence information
This program contains free of charge third party Java and Perl libraries. The detailed list of components, the detai
be found in the third party directory on the installer CD.
By answering Y you acknowledge that your use of these software is governed by the terms of the respective program li
----

Figure 2-66: Installation on Solaris - Basic Checks

2.6.2.2 License Information

When the basic checks are complete, the license agreement is displayed. To scroll down the agreement, press either the spacebar or the Enter key.

Read the agreement carefully before accepting.

2.6.2.3 Connection Details of External Oracle Database

The application prompts for the operating system user used during the Oracle installation. After providing it, it tries to determine the value of the ORACLE_HOME environment variable using that user, and asks for confirmation.

```
-----------------------------------------------------------------------------------------------

QUESTION : The OS user of Oracle [oracle]:

INFO : Found Oracle home: "/export/home/AlvariSTAR/db/product/10.2.0/db_1"

QUESTION : ORACLE_HOME environment variable
[/export/home/AlvariSTAR/db/product/10.2.0/db_1]:

INFO : Checking the Oracle home /export/home/AlvariSTAR/db/product/10.2.0/db_1

INFO : Oracle home /export/home/AlvariSTAR/db/product/10.2.0/db_1 seems to be OK

INFO : Checking Oracle version

INFO : Found Oracle version 10

INFO : Detected 64-bit Oracle
```

```
QUESTION : StarQuality OS user name [starq]:

INFO : Found StarQuality in /opt/starquality

INFO : Select user starq and group starq with directory /opt/starquality

INFO : Checking the environment of starq

INFO : Environment checking is done

INFO : Searching for running StarQuality modules

INFO : Oracle checking

INFO : Detected Solaris_x86 with 64 bit Oracle, so using full connect string
instead of TNS names

QUESTION : Oracle host name [localhost]:

QUESTION : Oracle port [1721]:

QUESTION : Oracle service name [BWANMS]:

QUESTION : Oracle SID [BWANMS]:

QUESTION : Oracle SYSTEM user password []:

CONFIRM  : Confirm the password:

ERROR: Password mismatch

QUESTION : Oracle SYSTEM user password []:

CONFIRM  : Confirm the password:

INFO : Attempting to tnsping localhost:1721

INFO : Successful

INFO : Attempting to login to Oracle with the SYSTEM user and the SID BWANMS

INFO : Successful

INFO : Attempting to login to Oracle with the SYSTEM user and the service name
BWANMS

INFO : Successful

INFO : Oracle checking successful

INFO : Configuring user SSH parameters

INFO : Done

---------------------------------------------------------------------
```

2.6.2.4 StarQuality Installation Prompts

The application prompts for the following:

- Operating system user name to be created

- Operating system group to be created
- Directory below the */opt* directory to be used by StarQuality,
- Profile file to be used
- Type of StarQuality installation

If the user and the directory already exist, but the installer cannot find a valid StarQuality installation in the directory, it asks whether it should continue or not. If it finds a StarQuality, it stops until all StarQuality modules are stopped.

The installer prompts for the installation type, that is, if you are installing an additional server. Answer No to this prompt.

```
------------------------------------------------------------------------
WARNING: !!! YOU SHOULD ONLY ANSWER YES TO THE FOLLOWING QUESTION!!!
WARNING: !!! IF YOU ARE INSTALLING AN ADDITIONAL (COLLECTOR) SERVER !!!
WARNING: !!! OR YOU ARE UPGRADING SUCH AN ADDITIONAL (COLLECTOR) SERVER !!!
QUESTION : Are you installing a collector server (Y/N) [N]:
QUESTION : Do you want to configure the Apache WEB server (Y/N) [Y]: y
INFO : Configuring Apache
QUESTION : On which port should Apache listen [80]:
QUESTION : Where is the Apache apachectl file [/usr/apache/bin/apachectl]:
QUESTION : Where is the Apache htpasswd file [/usr/apache/bin/htpasswd]:
QUESTION : Where is the Apache pid file [/var/run/apache/httpd.pid]:
QUESTION : Where is the Apache httpd.conf file [/etc/apache/httpd.conf]:
INFO : Creating backup /etc/apache/httpd.conf.20090512-122852 from
/etc/apache/httpd.conf
INFO : Stopping Apache
INFO : Creating a new /etc/apache/httpd.conf
INFO : Starting Apache
------------------------------------------------------------------------
```

2.6.2.5 Automatic Starting and Stopping

The installer application places scripts in the appropriate folder so that StarQuality can be automatically started and stopped. Automatic start/stop in this case does not include Oracle. If you are not installing a data collector server then the installer asks whether the Oracle has to be automatically started and stopped by the same script as well. You should only answer Yes if the Oracle server is running on the same machine and there is no other script to start and stop Oracle. If the Oracle server is running on the same machine but such a script already exists then you have to make sure that StarQuality starts after

the Oracle server and stops before the Oracle server. This question is among the few yes-no questions for which the installer stores the given answer and sets the default to your previous answer when running a second time, and can accept this default answer in silent mode automatically.

```
-------------------------------------------------------------------------
INFO : Creating the service script, so the operating system can automatically
INFO : start and stop StarQuality
WARNING  : !!! YOU SHOULD ONLY ANSWER YES TO THE FOLLOWING QUESTION IF !!!
WARNING  : !!! THE ORACLE DATABASE RUNS ON THIS SERVER AND YOU DO NOT  !!!
WARNING  : !!! HAVE ALREADY A START/STOP SCRIPT FOR THE ORACLE !!!
QUESTION : Should this script start/stop the Oracle server as well (Y/N) [Y]: n
WARNING  : !!! IF THE ORACLE RUNS ON THIS SERVER THEN MAKE SURE THAT   !!!
WARNING  : !!! IT STARTS BEFORE THE APPLICATION AND STOPS AFTER THE!!!
WARNING  : !!! APPLICATION !!!
INFO : Creating sym link /etc/rc0.d/K01starquality
INFO : Creating sym link /etc/rc3.d/S99starquality
-------------------------------------------------------------------------
```

2.6.2.6 Creating the StarQuality Tablespaces in the Database and the Oracle User

To create the tablespaces, the installer prompts for the following:

- Name, file name and size parameters for its configuration and data tablespaces. Leave name and size as prompted, but point to the partition as defined in the required Partitioning table.
- Name and password for its Oracle user.

```
-------------------------------------------------------------------------
INFO : Checking Oracle schema
INFO : Getting the default tablespace directory
QUESTION : StarQuality Conf tablespace name [SQ_CONF]:
QUESTION : StarQuality Conf tablespace file
[C:\ORACLE\PRODUCT\10.2.0\ORADATA\ORCL\SQ_CONF.dbf]:
QUESTION : StarQuality Conf tablespace size [300M]:
INFO : Creating the tablespace SQ_CONF, this could take several minutes
INFO : Oracle tablespace SQ_CONF created
QUESTION : StarQuality Data tablespace name [SQ_DATA]:
```

```
QUESTION : StarQuality Data tablespace file
[C:\ORACLE\PRODUCT\10.2.0\ORADATA\ORCL\SQ_DATA.dbf]:

QUESTION : StarQuality Data tablespace size [10000M]:

INFO : Creating the tablespace SQ_DATA, this could take several minutes

INFO : Creating the tablespace SQ_DATA, this could take several minutes

INFO : Oracle tablespace SQ_DATA created

QUESTION : StarQuality Oracle user name [SQ]:

QUESTION : StarQuality Oracle user password [******]:

INFO : Creating the Oracle schema, this could take several minutes

INFO : Oracle user SQ created

-------------------------------------------------------------------------
```

2.6.2.7 Finishing the Installation

1 The installer generates the schematic maps and exits.

```
-------------------------------------------------------------------------

INFO : Redrawing schematic maps

INFO : Installer ended

-bash-3.00#

-------------------------------------------------------------------------
```

2 To load a licence and run StarQuality, refer to:

- "Running StarQuality on Solaris" on page 108
- "Configuration Parameters" on page 109

2.7 Installation on Solaris Server with Oracle Database on a Separate Machine

Before beginning the StarQuality installation refer to Table 2-1 to ensure that this is the correct installation for your system.

This installation type involves configuration of the Solaris kernel parameters and the installation of the following components:

- Oracle server *on a separate machine*
- Oracle client *on the StarQuality machine*
- StarQuality

The required steps are:

1. Configure network ports (Section 2.7.1.1)
2. Install the Oracle (Section 2.7.1.2)
3. Install StarQuality (Section 2.7.2)
4. Run StarQuality (Section 2.10.3)

2.7.1 Pre-installation Tasks

2.7.1.1 Configuring Network Ports

The following ports must be open between the server machine, client machine, managed network equipment and other NMS/OSS elements:

Table 2-11: Network Ports

Use	Port	Protocol	Direction
App. server and managed equipment	161	SNMP	Outbound towards NE
App. server, managed equipment and other NMS/OSS elements	162	SNMP	Outbound towards NMS/OSS elements
App. server and managed equipment	69	TFTP	From Managed equipment to StarQuality
App. server and client	8080		Inbound/Outbound between client and server
Oracle communication client - server	As installed (Default: 1521)		From StarQuality to Oracle and from Oracle to StarQuality
Sending requests to AlvariSTAR in order to reach KPI	16162	SNMP	
SMTP server	25	SMTP	Outbound towards SMTP server

2.7.1.2 Installing Oracle

Follow these guidelines:

- Consult Table 2-1 for the correct Oracle Server/Client versions.
- Install Oracle Server on a standalone Oracle machine according to instructions issued by Oracle corporation. Make sure that the database is set to a minimum of 170 processes.
- Install Oracle client using the Administrator type installation.
- Set up the Oracle data files and redo logs according to the expected database size and system load. For details on these procedures, check the relevant Oracle Database documentation.
- When completing the Oracle client installation, use the Oracle Net Configuration Assistant to create a connection to the Database server, and test it.
- During StarQuality installation, the Oracle server must be running, and the database connection from the StarQuality machine should be available.
- To test connectivity to the database server from the StarQuality machine, use the *sqlplus* utility as follows:
  - » Assuming that the database SID is `testme`, and system password is `oracle`, switch to the command prompt (on Windows) or use a console (on Solaris, logged in as the Oracle user) and enter the following command: `sqlplus system/oracle@testme`.
  - » Enter `exit` or `quit` to complete the procedure.

- The following Oracle database information should be available when installing the StarQuality:
  - Oracle Database server IP
  - Service name (SID)
  - TNS
  - Password for SYSTEM use

2.7.2 Installing StarQuality

StarQuality can be installed on a Solaris 10 x86 operating system using the command-line installer.

All operations should be done while logged in as *root* user.

To install StarQuality (Solaris):

1. Run the installer application, *StarQuality.v3.0.en.bin*, either directly from the installation DVD or from a directory to which the file was transferred (using FTP).
2. Follow the next sections for installation details.

2.7.2.1 Basic Checks

The installer checks the following details:

- Version of the operating system
- Required packages
- Version of Perl and the options used to build the Perl binary

If the application detects an error during these checks, then, depending on the level of error, it either immediately terminates or asks whether it should continue or not. Always answer No and restart the installation.

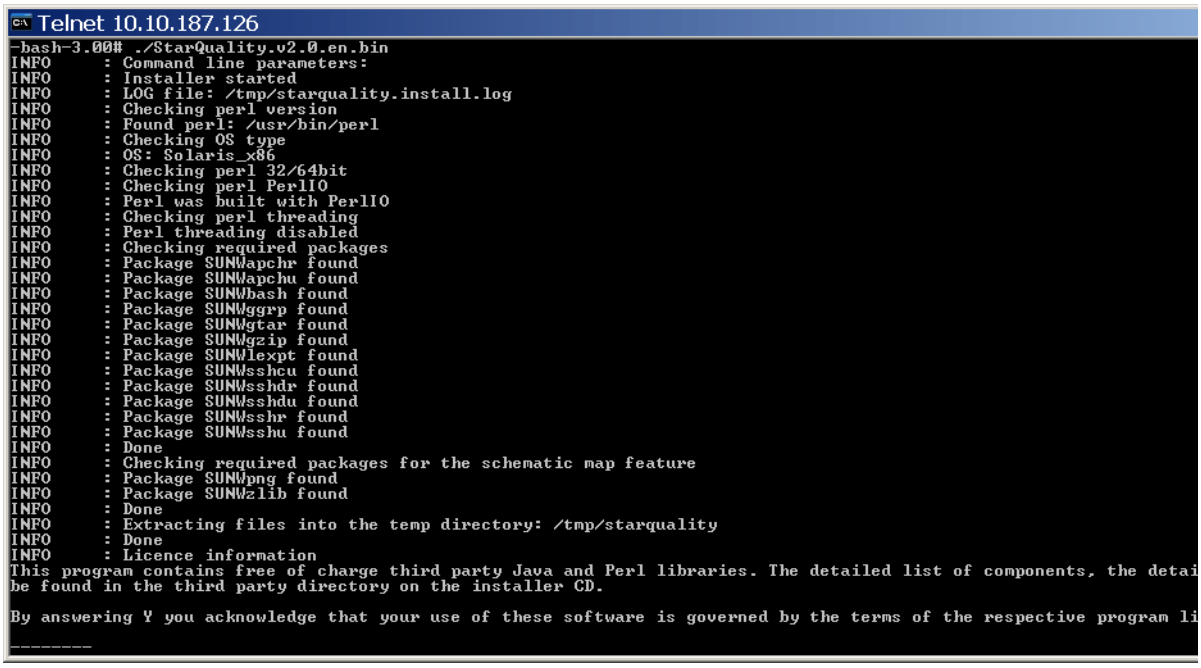

Telnet 10.10.187.126
-bash-3.00# ./StarQuality.v2.0.en.bin
INFO : Command line parameters:
INFO : Installer started
INFO : LOG file: /tmp/starquality.install.log
INFO : Checking perl version
INFO : Found perl: /usr/bin/perl
INFO : Checking OS type
INFO : OS: Solaris_x86
INFO : Checking perl 32/64bit
INFO : Checking perl PerlIO
INFO : Perl was built with PerlIO
INFO : Checking perl threading
INFO : Perl threading disabled
INFO : Checking required packages
INFO : Package SUNWapchr found
INFO : Package SUNWapchu found
INFO : Package SUNWbash found
INFO : Package SUNWggrp found
INFO : Package SUNWgtar found
INFO : Package SUNWgzip found
INFO : Package SUNWlexpt found
INFO : Package SUNWsshcu found
INFO : Package SUNWsshdr found
INFO : Package SUNWsshdu found
INFO : Package SUNWsshr found
INFO : Package SUNWsshu found
INFO : Done
INFO : Checking required packages for the schematic map feature
INFO : Package SUNWpng found
INFO : Package SUNWzlib found
INFO : Done
INFO : Extracting files into the temp directory: /tmp/starquality
INFO : Done
INFO : Licence information
This program contains free of charge third party Java and Perl libraries. The detailed list of components, the detai
be found in the third party directory on the installer CD.
By answering Y you acknowledge that your use of these software is governed by the terms of the respective program li
----

Figure 2-67: Installation on Solaris - Basic Checks

2.7.2.2 License Information

When the basic checks are complete, the license agreement is displayed. To scroll down the agreement, press either the spacebar or the Enter key.

Read the agreement carefully before accepting.

2.7.2.3 Connection Details of External Oracle Database

The application prompts for the operating system user used during the Oracle installation. After providing it, it tries to determine the value of the ORACLE_HOME environment variable using that user, and asks for confirmation.

```
-----------------------------------------------------------------------------------------------

QUESTION : The OS user of Oracle [oracle]:

INFO : Found Oracle home: "/export/home/AlvariSTAR/db/product/10.2.0/db_1"

QUESTION : ORACLE_HOME environment variable
[/export/home/AlvariSTAR/db/product/10.2.0/db_1]:

INFO : Checking the Oracle home /export/home/AlvariSTAR/db/product/10.2.0/db_1

INFO : Oracle home /export/home/AlvariSTAR/db/product/10.2.0/db_1 seems to be OK

INFO : Checking Oracle version

INFO : Found Oracle version 10

INFO : Detected 64-bit Oracle
```

```
QUESTION : StarQuality OS user name [starq]:

INFO : Found StarQuality in /opt/starquality

INFO : Select user starq and group starq with directory /opt/starquality

INFO : Checking the environment of starq

INFO : Environment checking is done

INFO : Searching for running StarQuality modules

INFO : Oracle checking

INFO : Detected Solaris_x86 with 64 bit Oracle, so using full connect string
instead of TNS names

QUESTION : Oracle host name [localhost]:

QUESTION : Oracle port [1721]:

QUESTION : Oracle service name [BWANMS]:

QUESTION : Oracle SID [BWANMS]:

QUESTION : Oracle SYSTEM user password []:

CONFIRM  : Confirm the password:

ERROR: Password mismatch

QUESTION : Oracle SYSTEM user password []:

CONFIRM  : Confirm the password:

INFO : Attempting to tnsping localhost:1721

INFO : Successful

INFO : Attempting to login to Oracle with the SYSTEM user and the SID BWANMS

INFO : Successful

INFO : Attempting to login to Oracle with the SYSTEM user and the service name
BWANMS

INFO : Successful

INFO : Oracle checking successful

INFO : Configuring user SSH parameters

INFO : Done

--------------------------------------------------------------------------
```

2.7.2.4 StarQuality Installation Prompts

The application prompts for the following:

- Operating system user name to be created
- Operating system group to be created

- Directory below the */opt* directory to be used by StarQuality
- Profile file to be used
- Type of StarQuality installation

If the user and the directory already exist but the installer cannot find a valid StarQuality installation in the directory, it asks whether it should continue or not. If it finds a StarQuality, it stops until all StarQuality modules are stopped.

The installer prompts for the installation type, that is, if you are installing an additional server. Answer No to this prompt.

```
------------------------------------------------------------------------
WARNING: !!! YOU SHOULD ONLY ANSWER YES TO THE FOLLOWING QUESTION!!!
WARNING: !!! IF YOU ARE INSTALLING AN ADDITIONAL (COLLECTOR) SERVER !!!
WARNING: !!! OR YOU ARE UPGRADING SUCH AN ADDITIONAL (COLLECTOR) SERVER !!!
QUESTION : Are you installing a collector server (Y/N) [N]:
QUESTION : Do you want to configure the Apache WEB server (Y/N) [Y]: y
INFO : Configuring Apache
QUESTION : On which port should Apache listen [80]:
QUESTION : Where is the Apache apachectl file [/usr/apache/bin/apachectl]:
QUESTION : Where is the Apache htpasswd file [/usr/apache/bin/htpasswd]:
QUESTION : Where is the Apache pid file [/var/run/apache/httpd.pid]:
QUESTION : Where is the Apache httpd.conf file [/etc/apache/httpd.conf]:
QUESTION : Authentication method to be used (BASIC, ldap, password_file, radius)
[password_file]:
INFO : Creating backup /etc/apache/httpd.conf.20090512-122852 from
/etc/apache/httpd.conf
INFO : Stopping Apache
INFO : Creating a new /etc/apache/httpd.conf
INFO : Starting Apache
------------------------------------------------------------------------
```

2.7.2.5 Automatic Starting and Stopping

The installer application places scripts in the appropriate folder so that StarQuality can be automatically started and stopped. Automatic start/stop in this case does not include Oracle. If you are not installing a data collector server then the installer asks whether the Oracle has to be automatically started and stopped by the same script as well. You should only answer Yes if the Oracle server is running on the same machine and there is no other script to start and stop Oracle. If the Oracle server is running on the

same machine but such a script already exists then you have to make sure that StarQuality starts after the Oracle server and stops before the Oracle server. This question is among the few yes-no questions for which the installer stores the given answer and sets the default to your previous answer when running a second time, and can accept this default answer in silent mode automatically.

```
------------------------------------------------------------------------
INFO : Creating the service script, so the operating system can automatically
INFO : start and stop StarQuality
WARNING  : !!! YOU SHOULD ONLY ANSWER YES TO THE FOLLOWING QUESTION IF !!!
WARNING  : !!! THE ORACLE DATABASE RUNS ON THIS SERVER AND YOU DO NOT  !!!
WARNING  : !!! HAVE ALREADY A START/STOP SCRIPT FOR THE ORACLE !!!
QUESTION : Should this script start/stop the Oracle server as well (Y/N) [Y]: n
WARNING  : !!! IF THE ORACLE RUNS ON THIS SERVER THEN MAKE SURE THAT   !!!
WARNING  : !!! IT STARTS BEFORE THE APPLICATION AND STOPS AFTER THE!!!
WARNING  : !!! APPLICATION !!!
INFO : Creating sym link /etc/rc0.d/K01starquality
INFO : Creating sym link /etc/rc3.d/S99starquality
------------------------------------------------------------------------
```

2.7.2.6 Creating the StarQuality Tablespaces in the Database and the Oracle User

The installer prompts for the following, and creates the tablespaces:

- Name, file name and size parameters for its configuration and data tablespaces. Leave name and size as prompted but point to the partition as defined in the required Partitioning table.
- Name and password for its Oracle user.

```
------------------------------------------------------------------------
INFO : Checking Oracle schema
INFO : Getting the default tablespace directory
QUESTION : StarQuality Conf tablespace name [SQ_CONF]:
QUESTION : StarQuality Conf tablespace file
[C:\ORACLE\PRODUCT\10.2.0\ORADATA\ORCL\SQ_CONF.dbf]:
QUESTION : StarQuality Conf tablespace size [300M]:
INFO : Creating the tablespace SQ_CONF, this could take several minutes
INFO : Oracle tablespace SQ_CONF created
QUESTION : StarQuality Data tablespace name [SQ_DATA]:
```

```
QUESTION : StarQuality Data tablespace file
[C:\ORACLE\PRODUCT\10.2.0\ORADATA\ORCL\SQ_DATA.dbf]:

QUESTION : StarQuality Data tablespace size [10000M]:

INFO : Creating the tablespace SQ_DATA, this could take several minutes

INFO : Creating the tablespace SQ_DATA, this could take several minutes

INFO : Oracle tablespace SQ_DATA created

QUESTION : StarQuality Oracle user name [SQ]:

QUESTION : StarQuality Oracle user password [******]:

INFO : Creating the Oracle schema, this could take several minutes

INFO : Oracle user SQ created

-------------------------------------------------------------------------
```

2.7.2.7 Completeing the Installation

1 The installer generates the schematic maps and exits.

```
-------------------------------------------------------------------------

INFO : Redrawing schematic maps

INFO : Installer ended

-bash-3.00#

-------------------------------------------------------------------------
```

2 To load a licence and run StarQuality, refer to:

- "Running StarQuality on Solaris" on page 108
- "Configuration Parameters" on page 109

2.8 Installation on Linux Server with External Oracle Database on the Same Machine

Before beginning the StarQuality installation refer to Table 2-1 to ensure that this is the correct installation for your system.

This installation type involves configuration of the Linux kernel parameters and the installation of the following components:

- Oracle server (Oracle client is not required)
- StarQuality

2.8.1 Pre-installation Tasks

2.8.1.1 Configuring Kernel Parameters for Linux x86

1 Edit the */etc/sysctl.conf* file and reboot the system:

```
# Kernel sysctl configuration file for Red Hat Linux
#
# For binary values, 0 is disabled, 1 is enabled. See sysctl(8) and
# sysctl.conf(5) for more details.

# Controls IP packet forwarding
net.ipv4.ip_forward = 0

# Controls source route verification
net.ipv4.conf.default.rp_filter = 1

# Do not accept source routing
net.ipv4.conf.default.accept_source_route = 0

# Controls the System Request debugging functionality of the kernel
kernel.sysrq = 0

# Controls whether core dumps will append the PID to the core filename
# Useful for debugging multi-threaded applications
kernel.core_uses_pid = 1
```

```
# Controls the use of TCP syncookies
net.ipv4.tcp_syncookies = 1

# Controls the maximum size of a message, in bytes
kernel.msgmnb = 65536

# Controls the default maxmimum size of a message queue
kernel.msgmax = 65536

# Controls the maximum shared segment size, in bytes
kernel.shmmax = 4294967295

# Controls the maximum number of shared memory segments, in pages
kernel.shmall = 268435456
```

2 Verify that there is a minimum of 10 GB swap space

2.8.1.2 Configuring Network Ports

The following ports must be open between the server machine, client machine, managed network equipment and other NMS/OSS elements:

Table 2-12: Network Ports

Use	Port	Protocol	Direction
App. server and managed equipment	161	SNMP	Outbound towards NE
App. server, managed equipment and other NMS/OSS elements	162	SNMP	Outbound towards NMS/OSS elements
App. server and managed equipment	69	TFTP	From Managed equipment to StarQuality
App. server and client	8080		Inbound/Outbound between client and server
Sending requests to AlvariSTAR in order to reach KPI	16162	SNMP	
SMTP server	25	SMTP	Outbound towards SMTP server

2.8.1.3 Installing Oracle Server

Follow these guidelines:

- Consult Table 2-1 for the correct Oracle Server version.
- Install Oracle Server according to instructions issued by Oracle corporation.
- Make sure that the database is set to a minimum of 170 processes.
- Set up the Oracle data files and redo logs according to the expected database size and system load. For details on these procedures, check the relevant Oracle Database documentation.
- During StarQuality installation, the Oracle server must be running, and the database connection from the StarQuality should be available.
- To test connectivity to the database server from the StarQuality machine, use the *sqlplus* utility as follows:
  - » Assuming that the database SID is `testme`, and the system password is `oracle`, use a console logged in as the Oracle user and enter the following command: `sqlplus system/oracle@testme`. If the SQL prompt is displayed, connectivity to the database server is confirmed. Any error message should be reported to and resolved by the DBA.
  - » Enter `exit` or `quit` to complete the procedure.
- The following Oracle database information should be available when installing StarQuality:
  - » Service name (SID)
  - » TNS
  - » Password for SYSTEM user

2.8.2 Installing StarQuality

StarQuality can be installed on a Linux x86 operating system using the command-line installer.

All operations should be done while logged in as *root* user.

To install StarQuality (Linux):

1. Run the installer application, *StarQuality.v3.0.en.bin*, either directly from the installation DVD or from a directory to which the file was transferred (using FTP).
2. Follow the next sections for installation details.

2.8.2.1 Basic Checks

The installer checks the following details:

- Version of the operating system
- Required packages
- Version of Perl and the options used to build the Perl binary,

If the application detects an error during these checks, then depending on the level of error, it either immediately terminates or asks whether it should continue or not. Always answer No and restart the installation.

```
--------------------------------------------------------------------------------
INFO : Command line parameters:
INFO : Installer started
INFO : LOG file: /tmp/starquality.install.log
INFO : Checking perl version
INFO : Found perl: /usr/local/bin/perl
INFO : Checking OS type
INFO : Found Red Hat 5
INFO : OS: Linux_x86
INFO : Checking perl 32/64bit
INFO : Checking perl PerlIO
INFO : Perl was built with PerlIO
INFO : Checking perl threading
INFO : Perl threading enabled
INFO : Checking required packages
INFO : Package bash found
INFO : Package openssh found
INFO : Package grep found
INFO : Package tar found
INFO : Package gzip found
INFO : Package httpd found
INFO : Package sed found
INFO : Done
INFO : Checking required packages for the schematic map feature
```

```
INFO : Package libjpeg 32 bit found

INFO : Package freetype 32 bit found

INFO : Package libXpm 32 bit found

INFO : Package libXau 32 bit found

INFO : Package libXdmcp 32 bit found

INFO : Package libX11 32 bit found

INFO : Done

INFO : Checking the SELinux state

INFO : SELinux is disabled, OK

INFO : Keep in mind that the SELinux must not be activated when StarQuality is
running

INFO : Extracting files into the temp directory: /tmp/starquality

INFO : Done

INFO : Licence information

This program contains free of charge third party Java and Perl libraries. The
detailed list of components, the detailed license files and sources can be found in
the third party directory on the installer CD.


By answering Y you acknowledge that your use of these software is governed by the
terms of the respective program licenses.

--------------------------------------------------------------------------------
```

2.8.2.2 License Information

When the basic checks are complete, the license agreement is displayed. To scroll down the agreement, press either the spacebar or the Enter key.

Read the agreement carefully before accepting.

2.8.2.3 Connection Details of External Oracle Database

The application prompts for the operating system user used during the Oracle installation. After providing it, it tries to determine the value of the ORACLE_HOME environment variable using that user, and asks for confirmation.

```
--------------------------------------------------------------------------------

QUESTION : The OS user of Oracle [oracle]:

INFO : Found Oracle home: "/home/oracle/oracle/product/10.2.0/client_2"

QUESTION : ORACLE_HOME environment variable
[/home/oracle/oracle/product/10.2.0/client_2]:
```

```
INFO : Checking the Oracle home /home/oracle/oracle/product/10.2.0/client_2

INFO : Oracle home /home/oracle/oracle/product/10.2.0/client_2 seems to be OK

INFO : Checking Oracle version

INFO : Found Oracle version 10

INFO : Detected 32-bit Oracle

QUESTION : StarQuality OS user name [starq]:

QUESTION : StarQuality OS user group [starq]:

QUESTION : StarQuality OS user password [******]:

QUESTION : StarQuality installation directory below the /opt directory
[starquality]:

INFO : Creating group starq

INFO : Creating user starq with shell /usr/local/bin/bash

INFO : Setting the user password

INFO : Select user starq and group starq with directory /opt/starquality

INFO : Checking the environment of starq

QUESTION : What is the profile file of the user starq
[/opt/starquality/.bash_profile]:

INFO : Setting the PS1 environment variable to "'[\u@\h]\$ '"

INFO : Setting the ORACLE_HOME environment variable to
"/home/oracle/oracle/product/10.2.0/client_2"

INFO : Setting the LD_LIBRARY_PATH environment variable to
"/opt/starquality/lib:/home/oracle/oracle/product/10.2.0/client_2/lib"

INFO : Setting the PATH environment variable to
"/usr/local/bin:/home/oracle/oracle/product/10.2.0/client_2/bin:$PATH"

INFO : Environment checking is done

INFO : Searching for running StarQuality modules

INFO : Oracle checking

QUESTION : TNS name []: QUESTION : Oracle host name [localhost]: QUESTION : Oracle
port [1521]: QUESTION : Oracle service name []: QUESTION : Oracle SID []: QUESTION
: Oracle SYSTEM user password []:

CONFIRM  : Confirm the password:

INFO : Attempting to tnsping db150

INFO : Successful

INFO : Attempting to tnsping 192.168.10.101:1521

INFO : Successful
```

```
INFO : Attempting to login to Oracle with the SYSTEM user and the TNS name db150

INFO : Successful

INFO : Attempting to login to Oracle with the SYSTEM user and the SID db150

INFO : Successful

INFO : Attempting to login to Oracle with the SYSTEM user and the service name
db150

INFO : Successful

INFO : Oracle checking successful

INFO : Configuring user SSH parameters

INFO : Done

INFO : Saving previous StarQuality config files

INFO : Untar StarQuality

INFO : Copy the define_wimax_brand.sql to the sql directory

-------------------------------------------------------------------------
```

2.8.2.4 StarQuality Installation Prompts

The application prompts for the following:

- Operating system user name to be created
- Operating system group to be created
- Directory below the */opt* directory to be used by StarQuality,
- Profile file to be used
- Type of StarQuality installation

If the user and the directory already exist, but the installer cannot find a valid StarQuality installation in the directory, then it asks whether it should continue or not. If it finds a StarQuality, it stops until all StarQuality modules are stopped.

The installer prompts for the installation type, that is, if you are installing an additional server. Answer No to this prompt.

```
-------------------------------------------------------------------------

WARNING  : !!! YOU SHOULD ONLY ANSWER YES TO THE FOLLOWING QUESTION!!!

WARNING  : !!! IF YOU ARE INSTALLING AN ADDITIONAL (COLLECTOR) SERVER!!!

WARNING  : !!! OR YOU ARE UPGRADING SUCH AN ADDITIONAL (COLLECTOR) SERVER!!!

QUESTION : Are you installing a collector server (Y/N) [N]:

-------------------------------------------------------------------------
```

2.8.2.5 Apache Configuration

If you are not installing a data collector, the installer asks whether it should configure the Apache WEB server or you will configure it later. This question is among the few yes-no questions for which the installer stores the given answer and sets the default to your previous answer when running a second time, and can accept this default answer in silent mode automatically.

If you answer Yes, the installer asks for various Apache files and the port to be used, and then configures it. The default answers given to the user during the installation represent the answers for the default Apache installation according to the operating system.

```
-------------------------------------------------------------------------

QUESTION : Do you want to configure the Apache WEB server (Y/N) [Y]:

INFO : Configuring Apache

QUESTION : On which port should Apache listen [80]:

QUESTION : On which port should Apache listen [80]:

QUESTION : Where is the Apache apachectl file [/usr/sbin/apachectl]:

QUESTION : Where is the Apache htpasswd file [/usr/bin/htpasswd]:

QUESTION : Where is the Apache pid file [/var/run/httpd.pid]:

QUESTION : Where is the Apache httpd.conf file [/etc/httpd/conf/httpd.conf]:

INFO  : Creating backup /etc/httpd/conf/httpd.conf.20110309-113933 from
/etc/httpd/conf/httpd.conf

INFO : Stopping Apache

INFO : Creating a new /etc/httpd/conf/httpd.conf

INFO : Using basic authentication

INFO : Starting Apache

-------------------------------------------------------------------------
```

2.8.2.6 Automatic Starting and Stopping

The installer application places scripts in the appropriate folder so that StarQuality can be automatically started and stopped. Automatic start/stop in this case does not include Oracle. If you are not installing a data collector server, the installer asks whether the Oracle has to be automatically started and stopped by the same script as well. You should only answer Yes if the Oracle server is running on the same machine and there is no other script to start and stop Oracle. If the Oracle server is running on the same machine but such a script already exists then you have to make sure that StarQuality starts after the Oracle server and stops before the Oracle server. This question is among the few yes-no questions for which the installer stores the given answer and sets the default to your previous answer when running a second time, and can accept this default answer in silent mode automatically.

```
-------------------------------------------------------------------------
INFO : Creating the service script, so the operating system can automatically
INFO : start and stop StarQuality
WARNING  : !!! YOU SHOULD ONLY ANSWER YES TO THE FOLLOWING QUESTION IF !!!
WARNING  : !!! THE ORACLE DATABASE RUNS ON THIS SERVER AND YOU DO NOT  !!!
WARNING  : !!! HAVE ALREADY A START/STOP SCRIPT FOR THE ORACLE !!!
QUESTION : Should this script start/stop the Oracle server as well (Y/N) [Y]:
WARNING  : !!! IF THE ORACLE RUNS ON THIS SERVER THEN MAKE SURE THAT   !!!
WARNING  : !!! IT STARTS BEFORE THE APPLICATION AND STOPS AFTER THE!!!
WARNING  : !!! APPLICATION !!!
INFO : Creating sym link /etc/rc0.d/K01starquality
INFO : Creating sym link /etc/rc6.d/K01starquality
INFO : Creating sym link /etc/rc3.d/S99starquality
INFO : Creating sym link /etc/rc5.d/S99starquality
-------------------------------------------------------------------------
```

2.8.2.7 Creating the StarQuality Tablespaces in the Database and the Oracle User

To create the tablespaces, the installer prompts for the following, and:

- Name, file name and size parameters for its configuration and data tablespaces. Leave name and size as prompted, but point to the partition as defined in the required Partitioning table.
- Name and password for its Oracle user.

```
-------------------------------------------------------------------------
INFO : Checking Oracle schema
INFO : Getting the default tablespace directory
QUESTION : StarQuality Conf tablespace name [SQ_CONF]:
QUESTION : StarQuality Conf tablespace file [D:\ORACLE\ORADATA\DB150\SQ_CONF.dbf]:
QUESTION : StarQuality Conf tablespace size [300M]:
INFO  : Creating the tablespace SQ_CONF, this could take several minutes
QUESTION : StarQuality Data tablespace name [SQ_DATA]:
QUESTION : StarQuality Data tablespace file
[D:\ORACLE\ORADATA\DB150\SQ_DATA_01.dbf]:
QUESTION : StarQuality Data tablespace size [10000M]:
INFO : Creating the tablespace SQ_DATA, this could take several minutes
```

```
QUESTION : StarQuality Oracle user name [SQ]:

QUESTION : StarQuality Oracle user password [******]:

INFO : Creating the Oracle schema, this could take several minutes

INFO : Oracle user SQ created

-------------------------------------------------------------------------
```

2.8.2.8 Completing the Installation

1 The installer generates the schematic maps and exits.

```
-------------------------------------------------------------------------

INFO : Redrawing schematic maps

INFO : Installer ended

-------------------------------------------------------------------------
```

2 To load a licence and run StarQuality, refer to “Configuration Parameters” on page 109

2.9 Installation on Linux Server with Oracle Database on a Separate Machine

Before beginning the StarQuality installation, refer to Table 2-1 to ensure that this is the correct installation for your system.

This installation type involves configuration of the Linux kernel parameters and the installation of the following components:

- Oracle server *on a separate machine*
- Oracle client *on the StarQuality machine*
- StarQuality

2.9.1 Pre-installation Tasks

2.9.1.1 Configuring Network Ports

The following ports must be open between the server machine, client machine, managed network equipment and other NMS/OSS elements:

Table 2-13: Network Ports

Use	Port	Protocol	Direction
App. server and managed equipment	161	SNMP	Outbound towards NE
App. server, managed equipment and other NMS/OSS elements	162	SNMP	Outbound towards NMS/OSS elements
App. server and managed equipment	69	TFTP	From Managed equipment to StarQuality
App. server and client	8080		Inbound/Outbound between client and server
Oracle communication client - server	As installed (Default: 1521)		From StarQuality to Oracle and from Oracle to StarQuality
Sending requests to AlvariSTAR in order to reach KPI	16162	SNMP	
SMTP server	25	SMTP	Outbound towards SMTP server

2.9.1.2 Installing Oracle

Follow these guidelines:

- Consult Table 2-1 for the correct Oracle Server/Client versions.
- Install Oracle Server on a standalone Oracle machine according to instructions issued by Oracle corporation. Make sure that the database is set to a minimum of 170 processes.
- Install Oracle client using the Administrator type installation.
- Set up the Oracle data files and redo logs according to the expected database size and system load. For details on these procedures, check the relevant Oracle Database documentation.
- When completing the Oracle client installation, use the Oracle Net Configuration Assistant to create a connection to the Database server, and test it.
- During StarQuality installation, the Oracle server must be running, and the database connection from the StarQuality machine should be available.
- To test connectivity to the database server from the StarQuality machine, use the *sqlplus* utility as follows:
  - Assuming that the database SID is `testme`, and the system password is `oracle`, use a console logged in as the Oracle user and enter the following command: `sqlplus system/oracle@testme`.
  - Enter `exit` or `quit` to complete the procedure.
- The following Oracle database information should be available when installing StarQuality:
  - Oracle Database server IP
  - Service name (SID)
  - TNS
  - Password for SYSTEM use

2.9.2 Installing StarQuality

StarQuality can be installed on a Linux x86 operating system using the command-line installer.

All operations should be done while logged in as *root* user.

To install StarQuality (Linux):

1. Run the installer application, *StarQuality.v3.0.en.bin*, either directly from the installation DVD or from a directory to which the file was transferred (using FTP).

2 Follow the next sections for installation details.

2.9.2.1 Basic Checks

The installer checks the following details:

- Version of the operating system
- Required packages
- Version of Perl and the options used to build the Perl binary

If the application detects an error during these checks, then depending on the level of error, it either immediately terminates or asks whether it should continue or not. Always answer No and restart the installation.

```
-----------------------------------------------------------------------------------------------

INFO : Command line parameters:

INFO : Installer started

INFO : LOG file: /tmp/starquality.install.log

INFO : Checking perl version

INFO : Found perl: /usr/local/bin/perl

INFO : Checking OS type

INFO : Found Red Hat 5

INFO : OS: Linux_x86

INFO : Checking perl 32/64bit

INFO : Checking perl PerlIO

INFO : Perl was built with PerlIO

INFO : Checking perl threading

INFO : Perl threading enabled

INFO : Checking required packages

INFO : Package bash found

INFO : Package openssh found

INFO : Package grep found

INFO : Package tar found

INFO : Package gzip found

INFO : Package httpd found

INFO : Package sed found

INFO : Done
```

```
INFO : Checking required packages for the schematic map feature

INFO : Package libjpeg 32 bit found

INFO : Package freetype 32 bit found

INFO : Package libXpm 32 bit found

INFO : Package libXau 32 bit found

INFO : Package libXdmcp 32 bit found

INFO : Package libX11 32 bit found

INFO : Done

INFO : Checking the SELinux state

INFO : SELinux is disabled, OK

INFO : Keep in mind that the SELinux must not be activated when StarQuality is
running

INFO : Extracting files into the temp directory: /tmp/starquality

INFO : Done

INFO : Licence information

This program contains free of charge third party Java and Perl libraries. The
detailed list of components, the detailed license files and sources can be found in
the third party directory on the installer CD.


By answering Y you acknowledge that your use of these software is governed by the
terms of the respective program licenses.

--------------------------------------------------------------------------------
```

2.9.2.2 License Information

When the basic checks are complete, the license agreement is displayed. To scroll down the agreement, press either the spacebar or the Enter key.

Read the agreement carefully before accepting.

2.9.2.3 Connection Details of External Oracle Database

The application prompts for the operating system user used during the Oracle installation. After providing it, it tries to determine the value of the ORACLE_HOME environment variable using that user, and asks for confirmation.

```
--------------------------------------------------------------------------------

QUESTION : The OS user of Oracle [oracle]:

INFO : Found Oracle home: "/home/oracle/oracle/product/10.2.0/client_2"
```

```
QUESTION : ORACLE_HOME environment variable
[/home/oracle/oracle/product/10.2.0/client_2]:

INFO : Checking the Oracle home /home/oracle/oracle/product/10.2.0/client_2

INFO : Oracle home /home/oracle/oracle/product/10.2.0/client_2 seems to be OK

INFO : Checking Oracle version

INFO : Found Oracle version 10

INFO : Detected 32-bit Oracle

QUESTION : StarQuality OS user name [starq]:

QUESTION : StarQuality OS user group [starq]:

QUESTION : StarQuality OS user password [******]:

QUESTION : StarQuality installation directory below the /opt directory
[starquality]:

INFO : Creating group starq

INFO : Creating user starq with shell /usr/local/bin/bash

INFO : Setting the user password

INFO : Select user starq and group starq with directory /opt/starquality

INFO : Checking the environment of starq

QUESTION : What is the profile file of the user starq
[/opt/starquality/.bash_profile]:

INFO : Setting the PS1 environment variable to "'[\u@\h]\$ '"

INFO : Setting the ORACLE_HOME environment variable to
"/home/oracle/oracle/product/10.2.0/client_2"

INFO : Setting the LD_LIBRARY_PATH environment variable to
"/opt/starquality/lib:/home/oracle/oracle/product/10.2.0/client_2/lib"

INFO : Setting the PATH environment variable to
"/usr/local/bin:/home/oracle/oracle/product/10.2.0/client_2/bin:$PATH"

INFO : Environment checking is done

INFO : Searching for running StarQuality modules

INFO : Oracle checking

QUESTION : TNS name []: QUESTION : Oracle host name [localhost]: QUESTION : Oracle
port [1521]: QUESTION : Oracle service name []: QUESTION : Oracle SID []: QUESTION
: Oracle SYSTEM user password []:

CONFIRM  : Confirm the password:

INFO : Attempting to tnsping db150

INFO : Successful
```

```
INFO : Attempting to tnsping 192.168.10.101:1521

INFO : Successful

INFO : Attempting to login to Oracle with the SYSTEM user and the TNS name db150

INFO : Successful

INFO : Attempting to login to Oracle with the SYSTEM user and the SID db150

INFO : Successful

INFO : Attempting to login to Oracle with the SYSTEM user and the service name
db150

INFO : Successful

INFO : Oracle checking successful

INFO : Configuring user SSH parameters

INFO : Done

INFO : Saving previous StarQuality config files

INFO : Untar StarQuality

INFO : Copy the define_wimax_brand.sql to the sql directory

-------------------------------------------------------------------------
```

2.9.2.4 StarQuality Installation Prompts

The application prompts for the following:

- Operating system user name to be created
- Operating system group to be created
- Directory below the */opt* directory to be used by StarQuality
- Profile file to be used
- Type of StarQuality installation

If the user and the directory already exist, but the installer cannot find a valid StarQuality installation in the directory, then it asks whether it should continue or not. If it finds a StarQuality, it stops until all StarQuality modules are stopped.

The installer prompts for the installation type, that is, if you are installing an additional server. Answer No to this prompt.

```
-------------------------------------------------------------------------

WARNING  : !!! YOU SHOULD ONLY ANSWER YES TO THE FOLLOWING QUESTION!!!

WARNING  : !!! IF YOU ARE INSTALLING AN ADDITIONAL (COLLECTOR) SERVER!!!

WARNING  : !!! OR YOU ARE UPGRADING SUCH AN ADDITIONAL (COLLECTOR) SERVER!!!
```

```
QUESTION : Are you installing a collector server (Y/N) [N]:

QUESTION : Do you want to configure the Apache WEB server (Y/N) [Y]:

INFO : Configuring Apache

QUESTION : On which port should Apache listen [80]:

QUESTION : On which port should Apache listen [80]:

QUESTION : Where is the Apache apachectl file [/usr/sbin/apachectl]:

QUESTION : Where is the Apache htpasswd file [/usr/bin/htpasswd]:

QUESTION : Where is the Apache pid file [/var/run/httpd.pid]:

QUESTION : Where is the Apache httpd.conf file [/etc/httpd/conf/httpd.conf]:

INFO : Creating backup /etc/httpd/conf/httpd.conf.20110309-113933 from
/etc/httpd/conf/httpd.conf

INFO : Stopping Apache

INFO : Creating a new /etc/httpd/conf/httpd.conf

INFO : Using basic authentication

INFO : Starting Apache

-------------------------------------------------------------------------
```

2.9.2.5 Automatic Starting and Stopping

The installer application places scripts in the appropriate folder so that StarQuality can be automatically started and stopped. Automatic start/stop in this case does not include Oracle. If you are not installing a data collector server then the installer asks whether the Oracle has to be automatically started and stopped by the same script as well. You should only answer Yes if the Oracle server is running on the same machine and there is no other script to start and stop Oracle. If the Oracle server is running on the same machine but such a script already exists then you have to make sure that StarQuality starts after the Oracle server and stops before the Oracle server. This question is among the few yes-no questions for which the installer stores the given answer and sets the default to your previous answer when running a second time, and can accept this default answer in silent mode automatically.

```
-------------------------------------------------------------------------

INFO : Creating the service script, so the operating system can automatically

INFO : start and stop StarQuality

WARNING  : !!! YOU SHOULD ONLY ANSWER YES TO THE FOLLOWING QUESTION IF !!!

WARNING  : !!! THE ORACLE DATABASE RUNS ON THIS SERVER AND YOU DO NOT  !!!

WARNING  : !!! HAVE ALREADY A START/STOP SCRIPT FOR THE ORACLE !!!

QUESTION : Should this script start/stop the Oracle server as well (Y/N) [Y]:
WARNING  : !!! IF THE ORACLE RUNS ON THIS SERVER THEN MAKE SURE THAT   !!!

WARNING  : !!! IT STARTS BEFORE THE APPLICATION AND STOPS AFTER THE!!!
```

```
WARNING  : !!! APPLICATION !!!

INFO : Creating sym link /etc/rc0.d/K01starquality

INFO : Creating sym link /etc/rc6.d/K01starquality

INFO : Creating sym link /etc/rc3.d/S99starquality

INFO : Creating sym link /etc/rc5.d/S99starquality

------------------------------------------------------------------------
```

2.9.2.6 Creating the StarQuality Tablespaces in the Database and the Oracle User

To create the tablespaces, the installer prompts for the following:

- Name, file name and size parameters for its configuration and data tablespaces. Leave name and size as prompted but point to the partition as defined in the required Partitioning table.
- Name and password for its Oracle user

```
------------------------------------------------------------------------

INFO : Checking Oracle schema

INFO : Getting the default tablespace directory

QUESTION : StarQuality Conf tablespace name [SQ_CONF]:

QUESTION : StarQuality Conf tablespace file [D:\ORACLE\ORADATA\DB150\SQ_CONF.dbf]:

QUESTION : StarQuality Conf tablespace size [300M]:

INFO : Creating the tablespace SQ_CONF, this could take several minutes

ERROR: The tablespace SQ_CONF already exists

QUESTION : The tablespace SQ_CONF already exists, do you whish to continue (Y/N)
[Y]:

QUESTION : StarQuality Data tablespace name [SQ_DATA]:

QUESTION : StarQuality Data tablespace file
[D:\ORACLE\ORADATA\DB150\SQ_DATA_01.dbf]:

QUESTION : StarQuality Data tablespace size [10000M]:

INFO : Creating the tablespace SQ_DATA, this could take several minutes

ERROR: The tablespace SQ_DATA already exists

QUESTION : The tablespace SQ_DATA already exists, do you whish to continue (Y/N)
[Y]:

QUESTION : StarQuality Oracle user name [SQ]:

QUESTION : StarQuality Oracle user password [******]:

INFO : Creating the Oracle schema, this could take several minutes
```

```
ERROR: The user SQ already exists

QUESTION : Do you want to continue with the schema creation (Y/N) [Y]:

INFO : Oracle user SQ created

-------------------------------------------------------------------------
```

2.9.2.7 Completing the Installation

1 The installer generates the schematic maps and exits.

```
-------------------------------------------------------------------------

INFO : Redrawing schematic maps

INFO : Installer ended

-------------------------------------------------------------------------
```

2 To load a licence and run StarQuality, refer to “Configuration Parameters” on page 109

2.10 Running StarQuality

2.10.1 Loading a StarQuality Licence

Obtain a licence file from the administrator and

To load a licence:

1. Place the licence file on the computer from which you activated the client.
2. From Settings select Servers > Licenses. The Licences Configuration window is displayed.
3. Click **[Add new]** and browse for the file containing the license.
4. Click **OK**. A list detailing the licenses is displayed.
5. Verify that none of the entries in the license list are colored red.
6. Press Ctrl-C on the keyboard.
7. Press Enter.

2.10.2 Running StarQuality on Windows

To start the server following initial installation:

1. Open a Cygwin shell and enter the command (by default it is not required to start it manually):

```
/usr/sbin/apachectl start
```

INFORMATION

If the Apache server is started this way, the Cygwin shell should remain open. Closing it will cause the Apache service to shut down.

2. Open a web browser and go to http://<ip or hostname>/. The StarQuality opening window is displayed.

Figure 2-68: Login Window

3 Enter the User Name and Password. The default admin users credentials are:

User Name: `admin`

Password: `admin123`

The StarQuality opening window is displayed for a few seconds and then the main interface window is displayed.

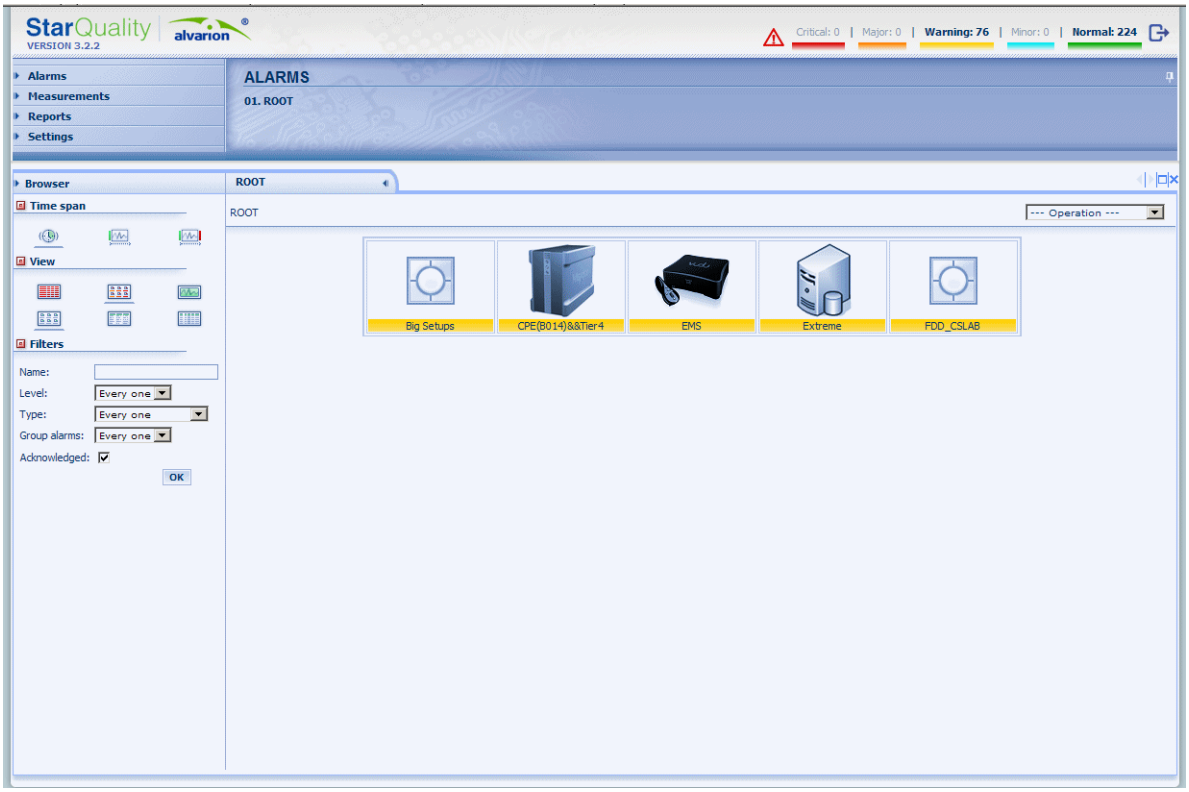


Figure 2-69: Main Window

4 From Settings select Servers > Licenses. The Licences Configuration window is displayed. The entries marked red indicate missing or invalid licences that should be replaced.

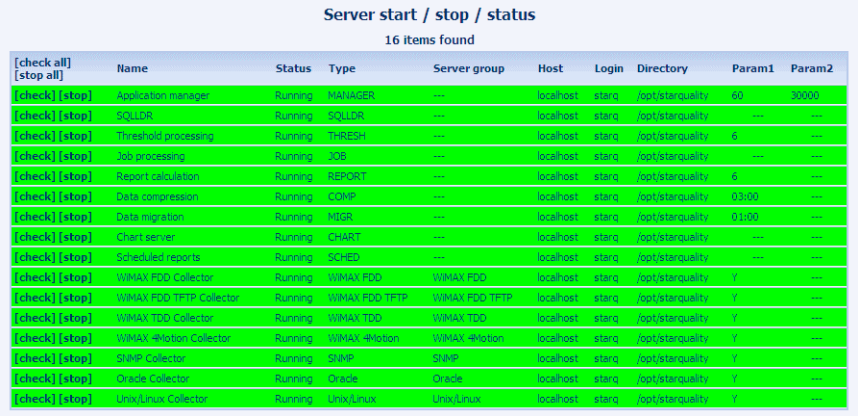
5 If necessary, load a new license file using the WEB GUI (see "To load a licence:" on page 105)

6 Do one of the following:

- In the computer service management window (myComputer > Manage > Services) start the services 'CYGWIN sshd' and 'StarQuality service'.
- In the WEB GUI, from Settings, select Servers > Start/Stop/Status, click [**start all**]. Wait for the list to refresh.
- Return to the cygwin shell and enter the command:

```
/opt/starquality/bin/start_stop_pvsr start
```

7 In the WEB GUI, from Settings select Server > Start/Stop/Status, click [**check all**], wait for all the entries to refresh and verify that all the entries are green.



Server start / stop / status

16 items found

[check all] [stop all]	Name	Status	Type	Server group	Host	Login	Directory	Param1	Param2
[check] [stop]	Application manager	Running	MANAGER	---	localhost	starq	/opt/starquality	60	30000
[check] [stop]	SQLLDR	Running	SQLLDR	---	localhost	starq	/opt/starquality	---	---
[check] [stop]	Threshold processing	Running	THRESH	---	localhost	starq	/opt/starquality	6	---
[check] [stop]	Job processing	Running	JOB	---	localhost	starq	/opt/starquality	---	---
[check] [stop]	Report calculation	Running	REPORT	---	localhost	starq	/opt/starquality	6	---
[check] [stop]	Data compression	Running	COMP	---	localhost	starq	/opt/starquality	03:00	---
[check] [stop]	Data migration	Running	MIGR	---	localhost	starq	/opt/starquality	01:00	---
[check] [stop]	Chart server	Running	CHART	---	localhost	starq	/opt/starquality	---	---
[check] [stop]	Scheduled reports	Running	SCHED	---	localhost	starq	/opt/starquality	---	---
[check] [stop]	WiMAX FDD Collector	Running	WiMAX FDD	WiMAX FDD	localhost	starq	/opt/starquality	Y	---
[check] [stop]	WiMAX FDD TFTP Collector	Running	WiMAX FDD TFTP	WiMAX FDD TFTP	localhost	starq	/opt/starquality	Y	---
[check] [stop]	WiMAX TDD Collector	Running	WiMAX TDD	WiMAX TDD	localhost	starq	/opt/starquality	Y	---
[check] [stop]	WiMAX 4Motion Collector	Running	WiMAX 4Motion	WiMAX 4Motion	localhost	starq	/opt/starquality	Y	---
[check] [stop]	SNMP Collector	Running	SNMP	SNMP	localhost	starq	/opt/starquality	Y	---
[check] [stop]	Oracle Collector	Running	Oracle	Oracle	localhost	starq	/opt/starquality	Y	---
[check] [stop]	Unix/Linux Collector	Running	Unix/Linux	Unix/Linux	localhost	starq	/opt/starquality	Y	---

Figure 2-70: Server Status Window

To stop the StarQuality server:

1 Do one of the following:

- In the computer Service Management window (myComputer > Manage > Services) stop the service 'CYGWIN sshd'.
- Open a Cygwin shell and enter the commands:

```
/usr/sbin/apachectl stop
```

```
/opt/starquality/bin/start_stop_pvsr stop
```

- In the WEB GUI, from Settings, select Servers > Start/Stop/Status, click [**stop all**]. Wait for the list to refresh.

2 In the WEB GUI, from Settings select Servers > Start/Stop/Status, click **[check all]**, wait for all the entries to refresh and verify that all the entries are red.

2.10.3 Running StarQuality on Solaris

To start the server following initial installation:

1 While logged in as root user enter the command (by default it is not required to start it manually):

```
/usr/apache/bin/apachectl start
```

The actual path may vary according to the Apache configuration.

2 Open a web browser and go to http://<ip or hostname>/.

3 Enter User Name and Password. The default admin users credentials are:

User Name: `admin`

Password: `admin123`

The StarQuality opening window is displayed for a few moments and then the main interface window opens. A message alerting a missing licence may appear, click **OK** and load a licence (see Step 5).

4 From Settings select Servers > Licenses. The Licences Configuration window is displayed. Check that all the entries are not marked red, which indicates invalid licences that should be replaced.

5 If necessary, load a new license file using the WEB GUI (see "Configuration Parameters" on page 109).

6 Do one of the following:

- Return to the StarQuality server machine console and enter the command:

```
/etc/init.d/starquality start
```

- In the WEB GUI, from Settings select Servers > Start/Stop/Status, click [**start all**]. Wait for the list to refresh.

7 In the WEB GUI, from Settings, select Servers > Start/Stop/Status, click [**Check all**], wait for all the entries to refresh and verify that all the entries are green.

To stop the server:

1 While logged in as root user, enter the command:

```
/usr/apache/bin/apachectl stop
```

The actual path may vary according to the Apache configuration.

2 Do one of the following:

» Return to the StarQuality server machine console and enter the command:

```
/etc/init.d/starquality stop
```

» In the WEB GUI, from Settings, select Servers > Start/Stop/Status, click [**stop all**]. Wait for the list to refresh.

3 In the WEB GUI, from Settings select Servers > Start/Stop/Status, click **[check all]**, wait for all the entries to refresh and verify that all the entries are red.

2.10.4 Configuration Parameters

- If you are using 4Motion devices, depending on their versions, you may need to set up StarQuality accordingly. For details, see "4Motion" on page 293.

- Choose wether StarQuality should store the raw XML performance collection files generated by WiMAX devices. See "Saving Performance Collection Files" on page 275 for details.
- Keep in mind that the maximum number of measurements for a single collector is 370,000. See "Activation/Deactivation of Data Collection" on page 139 for details on running the collectors.

Contact Alvarion's customer service for more information.

2.10.5 Data Aggregation and Data Retention Settings

By default, StarQuality stores measurements received in the performance collection files in 15 minutes cycles for 31 days. After that, data is archived in hourly averages. The hourly averages are deleted after 340 days.

In high load scenarios, it is recommended to perform custom database sizing and configuration. For details, please contact Alvarion Professional Services.

2.11 StarQuality Upgrade

The upgrade has to be performed by an administrator user.

For information on available upgrade paths, see the Release Notes.

Stop the StarQuality service and processes prior to upgrade.

NOTE! If you are running an upgrade, the installer may not keep the StarQuality files or existing collected data. Therefore, prior to upgrade, make sure to check the Release Notes for version specific information.

2.11.1 StarQuality Upgrade on Windows

To upgrade StarQuality (Windows):

1. Perform Stop Services as follows:
   a. On the desktop, right-click My Computer and select Manage.
   b. Select Services and Applications > Services.
   c. Right-click on StarQuality Service and select Stop
2. Run the installation program *starquality.exe*; The installation wizard is displayed.
3. Follow the installation instructions on the screen. The wizard runs as in the regular installation procedure until it reaches the StarQuality Schema Update window, which indicates that this is an upgrade. Click **Next**.

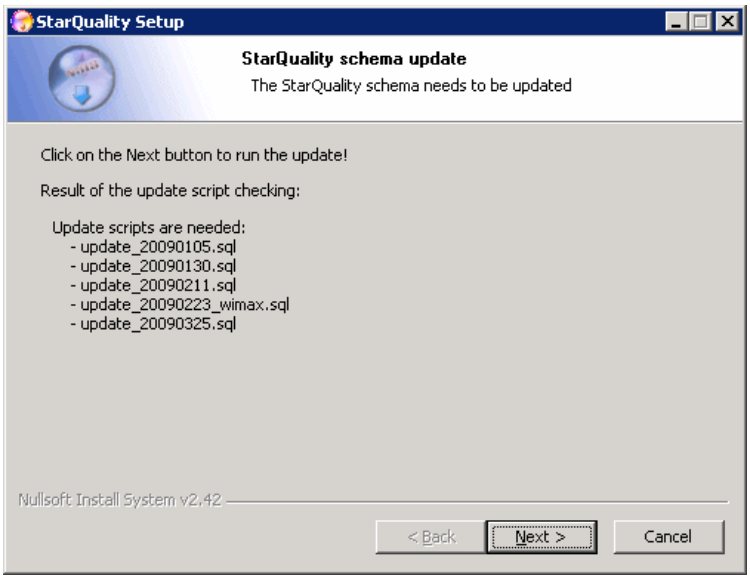


Figure 2-71: StarQuality Schema Update Window

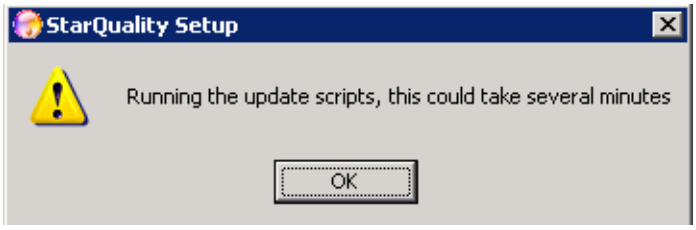


Figure 2-72: Setup Message

4 Click **OK** to the Setup message and wait for the installation to complete. Click **Finish**.

5 Proceed as in regular installation:

- Load a new licence that matches the new version (see "To load a licence:" on page 105)

INFORMATION

Depending on what license is present before the upgrade, the new license might deactivate the collection on certain collectors; Click **Reactivate eqs** in the Licence Configuration Window to start the collection on all devices (see Figure 2-71). A message will appear showing how many devices were activated.

- Start the servers (see "To start the server following initial installation:" on page 105)

2.11.2 StarQuality Upgrade on Solaris

The upgrade has to be performed by an administrator user.

Upgrade is available between immediate/adjacent versions only.

Stop the StarQuality service and processes prior to upgrade. This also stops the Oracle database, so you must start the database back manually prior to upgrade.

To upgrade StarQuality (Solaris):

1. Perform Stop Services as follows:
   a. While logged in as root user, enter the command:

      ```
      /usr/apache/bin/apachectl stop
      ```

      The actual path may vary according to the Apache configuration.

   b. Enter the command:

      ```
      /etc/init.d/starquality stop
      ```

2. Run the installer application, *StarQuality.v3.1.en.bin*
3. Press Ctrl-C on the keyboard, followed by Enter.

2.11.3 Configuration Parameters

1. Follow the installation prompts and enter:
   - OS user of Oracle
   - ORACLE_HOME environment variable
   - StarQuality OS user name
   - Oracle host name [localhost]:
   - Oracle port
   - Oracle service name
   - Oracle SID
   - Oracle SYSTEM user password

   The system runs DB update scripts.

2.12 Uninstalling StarQuality

2.12.1 Uninstalling StarQuality from Windows

To uninstall StarQuality from Windows:

1. Run the *UninstallStarQuality.exe* in the Cygwin root directory or select Start > Settings > Control Panel > Add or Remove Programs.
2. Fill in the SYSTEM password (oracle) and click **Uninstall**.

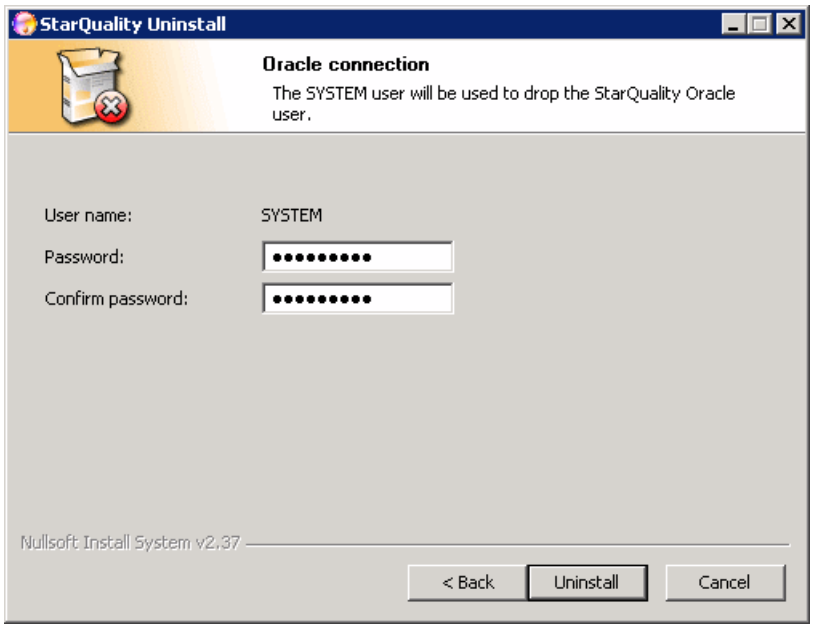


Figure 2-73: Uninstalling the Oracle User

2.12.2 Uninstalling StarQuality from Solaris

To uninstall StarQuality from Solaris:

1. Log on to the StarQuality machine as *root*.
2. Stop any running StarQuality module:
   a. From Settings select Servers > Start/Stop/Status.

b Click **[stop all]** and wait until all the entries of the list are red.

3 In a command window, run UninstallStarQuality from the StarQuality installation directory (default */opt/starquality*).

4 The application prompts for various confirmations. Follow the instructions and questions on the screen.

```
login: root
Password:
Last login: Mon May 11 16:18:25 from 172.30.105.112
Sun Microsystems Inc.   SunOS 5.10      Generic January 2005
You have new mail.
-bash-3.00# cd /opt/starquality/
-bash-3.00# ./UninstallStarQuality
INFO      : Command line parameters:
INFO      : Uninstaller started
INFO      : LOG file: /tmp/starquality.install.log
INFO      : Checking perl version
INFO      : Found perl: /usr/bin/perl
INFO      : Checking OS type
INFO      : OS: Solaris_x86
INFO      : Extracting files into the temp directory: /tmp/starquality
INFO      : Done
INFO      : Using the following values
INFO      : OS user: starq
INFO      : OS home directory: /opt/starquality
INFO      : StarQuality directory: /opt/starquality
QUESTION : Are these values correct (Y/N) [Y]:
INFO      : Searching for running StarQuality modules
QUESTION : Do you want to drop the Oracle user SQ (Y/N) [N]: y
QUESTION : The OS user of Oracle [oracle]: oracle
INFO      : Found Oracle home: "/export/home/oracle/oracle/product/10.2.0/db_1"
QUESTION : ORACLE_HOME environment variable [/export/home/oracle/oracle/product/
10.2.0/db_1]:
INFO      : Checking the Oracle home /export/home/oracle/oracle/product/10.2.0/db
_1
INFO      : Oracle home /export/home/oracle/oracle/product/10.2.0/db_1 seems to b
e OK
INFO      : Checking Oracle version
INFO      : Found Oracle version 10
INFO      : Detected 32-bit Oracle
QUESTION : Oracle SYSTEM user password []:
CONFIRM   : Confirm the password:
INFO      : If you drop the Oracle user SQ then your measurement data will be gon
e forever
QUESTION : Are you sure that you want to drop Oracle user SQ (Y/N) [N]: y
INFO      : Dropping the Oracle user SQ, this could take several minutes
INFO      :
User dropped.
INFO      : Done
QUESTION : Do you want to drop the Oracle tablespace SQ_DATA (Y/N) [N]: y
INFO      : Dropping the Oracle tablespace SQ_DATA, this could take several minut
es
INFO      :
Tablespace dropped.
INFO      : Done
QUESTION : Do you want to drop the Oracle tablespace SQ_CONF (Y/N) [N]: y
INFO      : Dropping the Oracle tablespace SQ_CONF, this could take several minut
es
INFO      :
Tablespace dropped.
INFO      : Done
QUESTION : Do you want to restore the Apache configuration (Y/N) [N]: n
QUESTION : Do you want to delete the entire /opt/starquality directory (Y/N) [N]
: y
INFO      : Deleting the directory /opt/starquality
INFO      : Deleting any S??starquality files in the /etc/rc*d directories
INFO      : Deleting any K??starquality files in the /etc/rc*d directories
INFO      : Deleting the file: /etc/init.d/starquality
INFO      : Done
QUESTION : Do you want to delete the user starq (Y/N) [N]: y
INFO      : Deleting the user starq
INFO      : Deleting the group starq
INFO      : Deleting the directory /opt/starquality
INFO      : Done
-bash-3.00#
```

Figure 2-74: Uninstalling StarQuality from Solaris

2.13 Installation Troubleshooting

Problem/Issue	Action
The installer cannot connect to the database (in Windows)	Use a password that does not contain problematic characters: @, $, etc. The installation log is located in: *C:\Documents and Settings\<user>\Local Settings\Temp\1*
Cannot start SSHD	1. Delete the SSHD user. 2. Delete the cygwin folder. 3. Remove any cygwin and SSHD entries from the registry. 4. Restart the computer. 5. Verify that the installing user has administrator rights.
Java 1.5 Is Missing on Solaris	If the installation requires java1.5, enter the full path including java, foe example: */usr/jdk/instances/jdk1.5.0/bin/java*
Installing via TeamViewer	Before beginning the installation, open the Teamviewer server: 1. Open: extras > options > advanced > show advanced options > advanced network settings 2. Select the check-box: "Don't use incoming ports 80..." 3. Click OK and verify that port 80 is free
Installing on a 64 Bit Windows Machine with Oracle 64 Bit	Use Oracle 32 bit client
Installing on a 64 Bit Windows Machine with External Oracle	Do one of the following: ■ Use Oracle 32 bit client ■ Insert a registry entry as follows: a. Create an ORACLE key in *regedit* under HKLM /SOFTWARE/WOW6432Node b. Add a new String value to this key with: Name - ORACLE_HOME Value - Oraclexe home where bin is found and bin should contain sqlplus.exe

Problem/Issue	Action
When running StarQuality installer (for upgrade or uninstall) the process halts with the following message: `Server module XXX is still running!`	Check for running StarQuality processes: In the folder */opt/starquality/tmp* look for files with names such as: "pid_###". Each of these files represents a running StarQuality process and the number represents the collector number as can be seen in the StarQuality client (Settings > Servers > Server Configuration). Stop (kill) the process and resume the operation of the installer.

Chapter 3 - Getting Started

In this chapter:

- "Login" on page 119
- "The Structure of Interface Windows" on page 121
- "The Menu System" on page 122
- "Operations and Navigation in the Hierarchy" on page 126
- "General Display Options" on page 127
- "Editing Objects" on page 129
- "Searching Objects" on page 130

3.1 Login

10 working clients may simultaneously use the system. Using the system is possible with the following web browsers:

- Microsoft Internet Explorer
- Mozilla Firefox

To start a client session with StarQuality:

1 Open a web browser and go to http://<ip or hostname>/. The StarQuality opening window is displayed.

Figure 3-1: Login Window

2 Enter the User Name and Password. The default admin users credentials are:

```
admin

admin123
```

The StarQuality opening window is displayed for a few moments and then the main interface window opens (see Figure 3-3).

If Flash Player is not installed on the machine from which the client is opened, the following message appears:

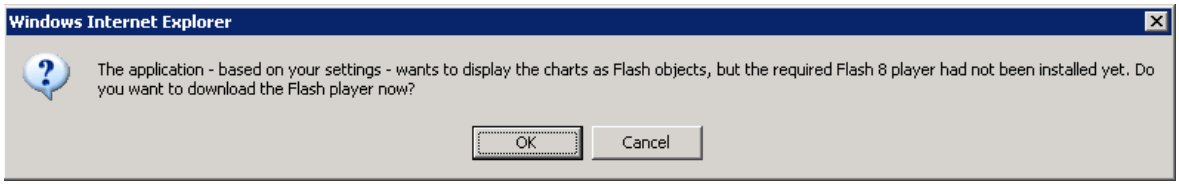

Windows Internet Explorer
The application - based on your settings - wants to display the charts as Flash objects, but the required Flash 8 player had not been installed yet. Do you want to download the Flash player now?
OK
Cancel

Figure 3-2: Flash Player Message Window

You can install Flash to display data with Flash functionality. If you do not install Flash, the data is displayed without Flash features.

3 You can proceed with discovering the network (see "Network Discovery" on page 131), modify settings or start monitoring the equipment.

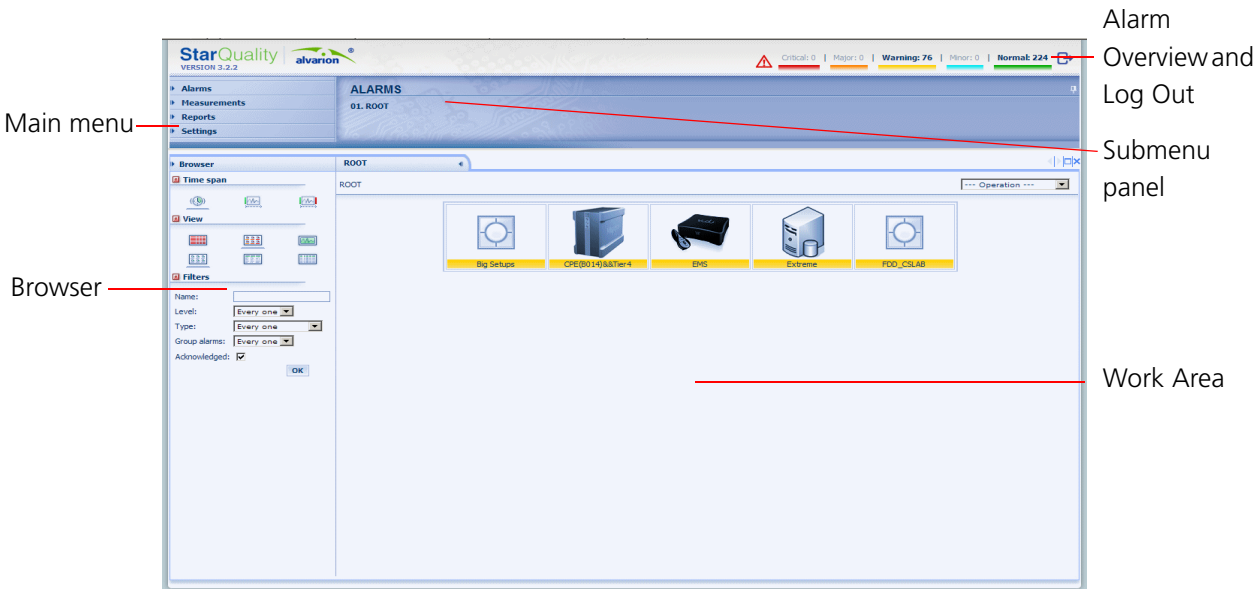


Figure 3-3: The StarQuality User Interface

3.2 The Structure of Interface Windows

The interface of the StarQuality application divides the browser window into several panels (see Figure 3-3):

- **Alarm overview bar** - displays current alarms, grouped by their severity level. This also acts as a shortcut to the alarm screens. The application displays only alarms that the user has permissions to view. If access to alarms is unavailable, the bar is completely missing.
- **The main menu** - contains the main operation tasks of the system: Alarms, Measurements, Reports, and Settings. Selecting each item on this menu opens various submenus and groups displayed in the submenu panel and in the browser. For detailed structure, refer to "The Menu System" on page 122.
- **Submenu panel** - the submenus under the selected menu item are displayed on the adjoining right hand side panel. This panel can be scrolled (up and down) using the arrows on its right edge. The submenu structure displayed here can be customized in order to accelerate the execution of frequently repeated navigation steps.
- **The browser** - located on the bottom left side of the user interface. The browser can contain further submenu items and special menu groups based on the chosen menu items in the upper menu system.

  Non-administrator users can only view those alarms/pieces of equipment/sites for which they have permissions. Refer to "User levels and Their Settings" on page 5.

  The user name and type appears in the title of the web browser window.

3.3 The Menu System

The following sections describe the main menu, the submenus under it and the menu items and groups appearing in the browser. These items vary depending on the selected item in the main menu. For example: Time Span is displayed only when selecting Measurements or Alarms in the main menu (see Figure 3-4.

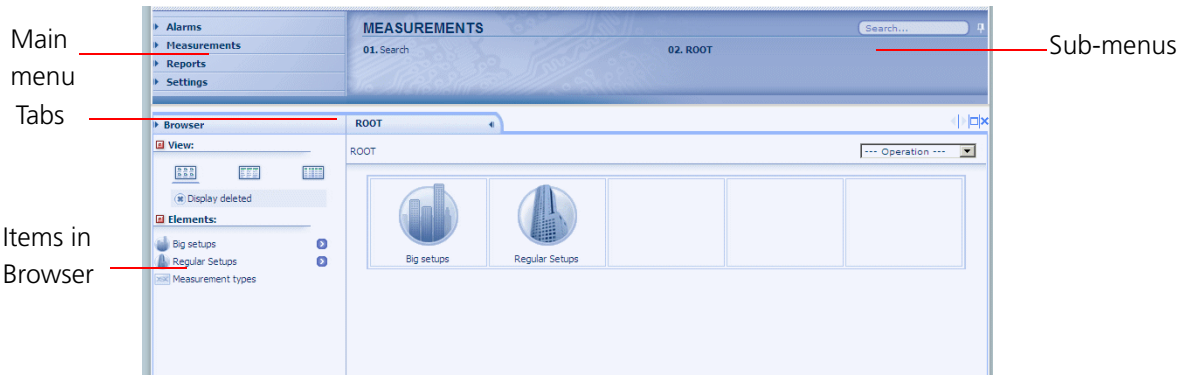


Figure 3-4: Example of Menus, Submenu Panel and Browser (in Measurements)

3.3.1 Alarms

The following items are displayed when selecting Alarms from the main menu:

Table 3-1: Alarms

Item	Description	See also
Items in the submenu panel		
Root	root directory navigation startpoint	
Public and private menu items for viewing the alarms under the chosen menu item (if defined)		
Items in the Browser		
Time Span	Selecting the time range to display alarms: ■ from time/date to time/date ■ day/week/month/year ■ real time view - auto refresh view	"Viewing Alarms by Time Span" on page 197
View menu group:	Selecting the display mode for the alarms	"Alarm Display Options" on page 197
Filters menu group	Filtering of the alarms to be displayed	"Filtering Alarms" on page 201

3.3.2 Measurements

The following items are displayed when selecting Measurements from the main menu:

Table 3-2: Measurements

Item	Description	See also
Items in the submenu panel		
Search	Search for sites, equipments, measurements and charts on the basis of sites/equipment names	"Searching Measurements" on page 167
Root	root directory navigation startpoint	
Public and private menu items for viewing the alarms under the chosen menu item (if defined)		
Items in the Browser		
View menu group:	Selecting the display mode for the alarms	"Measurements Display Options" on page 158
Split View	Displaying two lists of elements in the main area and compare elements	"Displaying Elements Side-by-Side" on page 159
Time Span	Selecting the time range to display measurements (appears only when selecting a measurement): ■ from time/date to time/date ■ day/week/month/year ■ real time view - auto refresh view	"Viewing Measurements by Time Span" on page 163
Chart Settings	Displaying the measurement values	"Chart Settings" on page 165
Elements menu group	Contains a list of the sites, equipments and measurement types. The root of the hierarchy is determined by the originally selected menu item. ■ Element name, e.g. <FDD Network> - If the list contains too many elements, they are grouped by the system, using links pointing to the sub-lists. ■ Measurement Types - for filtering the measurements by their types	"Element Browsing Options" on page 160

3.3.3 Reports

The following items are displayed when selecting Reports from the main menu:

Table 3-3: Reports

Item	Description	See also
Items in the submenu panel		
On-demand report	setting a new report	"Working with On-Demand Reports" on page 213
Bulk export wizard	Exporting reports to Excel	"Exporting Data from the StarQuality Database" on page 224
Direct links to the built-in reports		"Oracle data API (Application Program Interface), for bulk export of large amounts of data by selection of chosen NEs date range and KPIs." on page 205
Items in the Browser		
Calendar	The reports are displayed according to the time interval selected in the calendar.	
Settings	Appear only when displaying reports, include: ■ Type ■ Show date column	"Setting the Report Range and Display" on page 222

3.3.4 Settings

For each item in the submenu panel, different items appear in the Browser, depending on the access rights of the user.

The following items appear in the submenu panel when selecting Settings from the main menu:

Table 3-4: Settings

Item	Description	See also
Search	Searching the configured objects based on sites/equipment names	"Searching Objects" on page 130
Site and equipment configuration	Configuring basic and virtual sites and equipment objects	"Site and Equipment Configuration" on page 233

Table 3-4: Settings (Continued)

Item	Description	See also
Thresholds	Setting alarm threshold parameters (admin only)	"Setting Alarm Thresholds" on page 174
Reports	Setting and viewing system reports (admin only)	"Reports" on page 204
Customization	Editing of "public" objects refers to the administrator users, while editing of "private" objects refers to the rest of the users	"Customization" on page 248
Templates	Editing various system templates (admin only)	"Creating and Editing Threshold Templates" on page 176
Servers	Managing and configuring servers (admin only)	"Server Configuration and Management (Admin only)" on page 255
User	Managing user settings	"Managing Licences" on page 257

3.4 Operations and Navigation in the Hierarchy

In Alarms, Measurements and Reports pages (and also under the Settings > Site and Equipment Configuration submenu) there are three elements at the top of the page. These fields are always visible (even if the page is scrolled):

- The **Operations** pull down menu (located at the top-right), contains different options depending on the current object and menu item (see Figure 3-5):
  - » Fast navigation between the menu items while keeping the actual location within the hierarchy; for example, immediate opening of the measurement charts form the equipment configuration.
  - » A Print option for Alarms, Measurements and Reports, because this is the only possible way to print the full content of the main display area (the basic print function of the browser is not suitable for this)
  - » For Measurements, an option to save the current object as a menu item

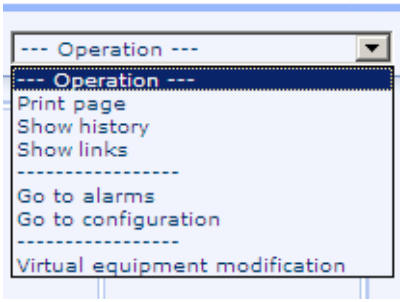


Figure 3-5: Example of Operations pull down menu

- A path (at the top-left) showing the current location within the hierarchy. It is always possible to click on the elements of this list, except for the last one, and return to a higher hierarchy level.

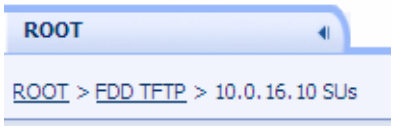


Figure 3-6: Hierarchy Path

If during the navigation you access an equipment through one of its virtual sites then after any equipment modification you cannot get back to that point in the virtual hierarchy, because the application will modify the current location according to the normal hierarchy, i.e. it will show the equipment under its parent site.

Notice that by using the fast navigation between the menu items (see the above bullet), the current location within the hierarchy might change: although the page will show the selected object, the path shown to the root object might be incorrect.

3.5 General Display Options

3.5.1 Scrolling or Hiding the Submenu Items

- If the name of a menu item is too long to display, it is abbreviated. To view the entire text as a tooltip, move the mouse pointer over it.
- To hide the entire menu system, click on the icon at the top-right corner of the panel (Figure 3-7). In this case the component can only be viewed if the mouse pointer is placed above it.
- To cancel the automatic hiding of the panel, click on the hiding icon again.

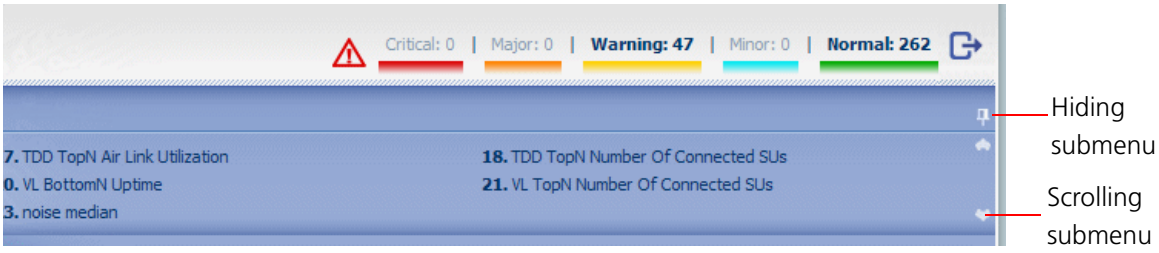

Critical: 0 | Major: 0 | Warning: 47 | Minor: 0 | Normal: 262
7. TDD TopN Air Link Utilization
0. VL BottomN Uptime
3. noise median
18. TDD TopN Number Of Connected SUs
21. VL TopN Number Of Connected SUs
Hiding submenu
Scrolling submenu

Figure 3-7: Scrolling and Hiding the Submenu

3.5.2 Using the Display Tabs

You can work with several open pages at the same time. The current page or pages currently in use are displayed as tabs. You navigate the opened pages with the tabs on the top of the pages. The selected page always comes up in the front. The tabs can also be scrolled horizontally.

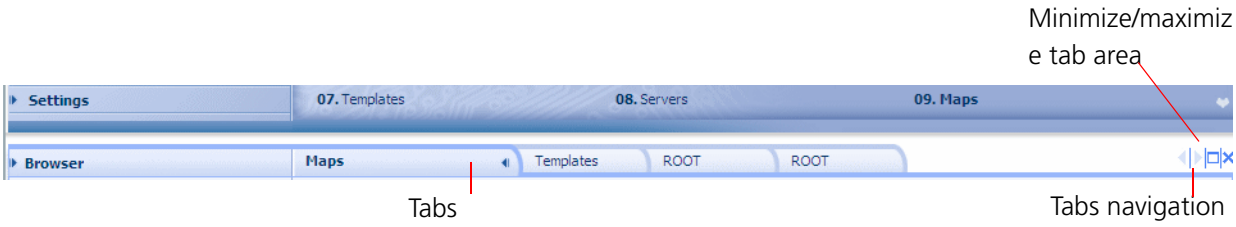


Figure 3-8: Navigation Tabs

When a page is put in the background, the browser window stores its content that is subsequently restored when the user chooses to display that page again.

If you select a menu item, the requested page is displayed instead of the current page. However, it is also possible to load the new page in a new tab. This is the default option when using the Alarms fast menu, while in the configurable menus you can select whether the new page should be displayed in a new or in an already existing tab.

To set the tab display options:

Use the following options to set the tabs display:

Table 3-5: Setting the Tab Display Options

To	Do this:
Select the tab display mode	Right-click on the menu items and select either “Open in a new tab” or “Open in tab: <existing_tab_name>”.
Rename the tab	Click the tab title, type the name and press Enter.
Maximize/minimize the page to entire window	Use the icon at the top-right corner (see Figure 3-8)

3.6 Editing Objects

This section explains the general editing principles of the system. The various possibilities of editing different kinds of objects are discussed in detail in the corresponding sections.

The list of editable objects is displayed in a table that, with the exception of the Site-equipment-measurement Configuration page, contains the most important attributes of the objects.

In the Settings menu you can edit the various objects of the system.

To edit objects:

Use one of the following options, when available:

Table 3-6: Editing Objects

To	Do this:	Comments
Delete an object (only if it has no sub-elements)	Click **[del]**	The system always prompts to confirm the action before it is executed.
Modify an object	Click **[edit]** and modify the parameters	Click **OK** or Cancel
Create a new simple object	Click **[add new]**	
Create objects based on a template	Click **[from template]**	
Create objects based on another object	Click **[copy from]**	
Perform other editing operations	Use the pull down menu available on the screen	Applicable in case of normal and virtual sites.

3.7 Searching Objects

Searching is done only by names of sites and equipment.

Under the Settings > Search menu item you can search the stored objects in the system. This menu is only accessible to the administrator and restricted administrator users.

There are two search interfaces available: simple and advanced. The simple interface requires typing in your search rules, while the advanced interface uses graphical controls. You can toggle between them by clicking on **Simple Search** and **Advanced Search** respectively.

To start searching for an object:

Specify a searching string, using one of the following methods:

1. Simple search: type the string directly in the input field, and click **OK**.
2. Click **Advanced Search**; an advanced window is displayed, which facilitates the construction of the searching string and contains the following insert fields:

Table 3-7: Advanced Search Criteria

Criterion	Description
Search by parent attribute	■ **Yes** - restrict your search to equipment that has the parent attribute enabled. The system finds those objects whose parent name meets the conditions ■ **No** - disregard the parent attribute.
Field	Select a variable by which to filter your results.
Search	Type in a value that must apply to the field you selected. You can use ? and * to replace a single character or a string of characters.
Without	Type in characters to be ignored by the system. You can use ? and * characters to replace a single character or a string of characters.
Type	Always choose Equipment
Results count	Limits the maximum number of results (10 to 500)

3. Click **OK**; The results are displayed as well as the searching string as it would appear at simple search.

Chapter 4 - Network Discovery

In this chapter:

- "Overview" on page 132
- "Discovery of WiMAX Devices" on page 135
- "Discovery of Equipment under a Server-Health Site" on page 142

4.1 Overview

At first login, the system contains only a ROOT site. You build your new network (sites) under the ROOT to be able to start monitoring your equipment performance using the StarQuality.

Mapping the network in StarQuality can be done using various structures, such as by geographical locations, by topics, etc. This section explains the creation of a a WiMAX network and all the BTSs under it, and creating a utility network.

Following are available site types:

- WiMAX-equipment
  - WiMAX FDD SNMP - FDD versions 3.5/3.6, SNMP data collection. Up to 10 SUs per BTS can be measured
  - WiMAX FDD TFTP - FDD version 3.7 and later, TFTP data collection
  - WiMAX TDD - TDD versions 4.5 and later, TFTP data collection
  - 4Motion - versions 2.5M, 3.0, 3.0M, 3.5
  - BreezeACCESS VL - version 6.0. Up to 10 SUs per BTS can be measured
  - Extreme - version 1.8
- Server Health
  - AlvariSTAR Version 4.0 and later
  - Oracle
  - UNIX

The measurements can be viewed not less than 30 minutes following the initial collection for each device.

For more information on configuration, refer to Chapter 9 - “General Setting Options” on page 230.

To create a WiMAX network site under ROOT:

1. From Settings select **Site and Equipment Configuration**.
2. From the Creation drop-down menu select **Create New Site**. Fill in the site name (free text), and its description (optional).
3. Select a corresponding icon.

4 Select a Server Group (see Figure 4-1):

- For FDD 3.5/3.6 network - WiMAX FDD
- For FDD 3.7 network - WiMAX FDD TFTP
- For TDD network - WiMAX TDD
- For 4Motion (ver.2.5) network - WiMAX 4Motion
- For Extreme network - WiMAX Extreme
- For VL network - WiMAX VL

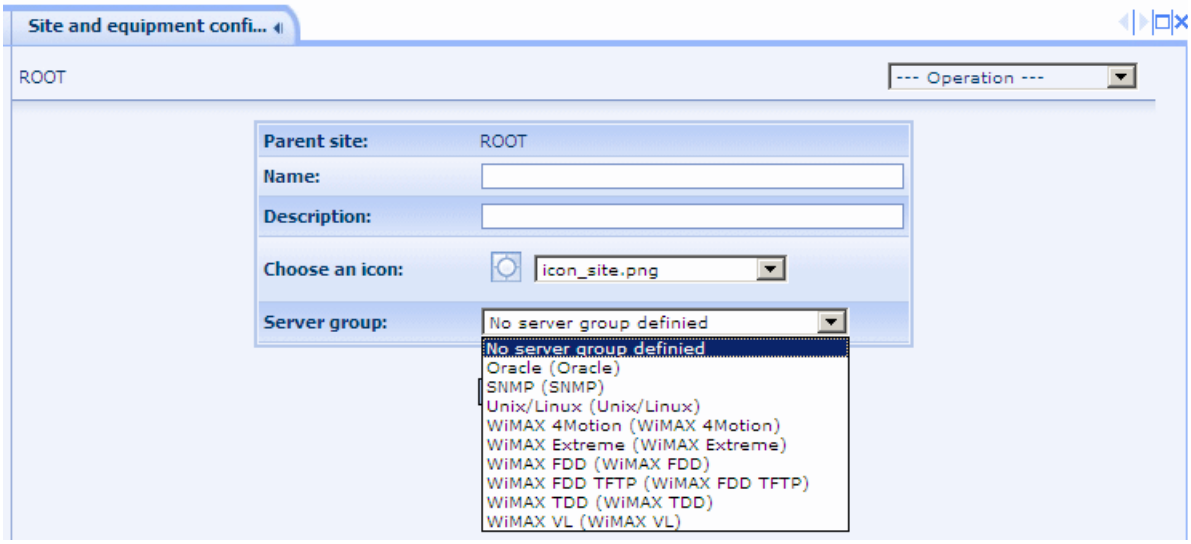


Figure 4-1: Creating a New Site - Server Group Selection

5 Click **OK**; The network site is created under the ROOT.

6 Proceed with discovery of devices according to the site type you created: refer to "Discovery of WiMAX Devices" on page 135.

To create a Server Health site under ROOT:

1 From Settings select **Site and Equipment Configuration**.

2 From the Creation drop-down menu select **Create New Site**. Fill in the site name (free text), and its description (optional).

3 Select a corresponding icon.

4 Select the **SNMP Server Group** (see Figure 4-1).

5 Click **OK**; The site is created under the ROOT.

6 Proceed with discovery of devices according to the site type you created: refer to "Discovery of Equipment under a Server-Health Site" on page 142

4.2 Discovery of WiMAX Devices

Data collection is automatically activated after discovery, except for equipments collected by SNMP, for which data collection has to be activated manually.

4.2.1 Manually Activating WiMAX Devices Discovery

This section describes how to add BTSs to the network.

To manually activate discovery:

1. Verify that the Network Discovery Prerequisites relevant for the WiMAX type are met (refer to Chapter 11)
2. From Settings, select Site and Equipment Configuration.
3. Enter the site matching the equipment type to be discovered, by clicking its icon.
4. From the Creation drop down menu select **Add Equipments** (plural) **from Template**.
5. The correct template is automatically inherited from the site. Click **OK**. If you need to override it, select the template upon which to base the equipment setup:
   - For FDD ver3.5/3.6 - WiMAX FDD SNMP
   - For FDD ver3.7 - WiMAX FDD TFTP
   - For TDD - TDD
   - For 4Motion - WiMAX 4Motion
   - For VL - WiMAX VL
   - For Extreme - WiMAX Extreme

   A basic setup template page is displayed.

INFORMATION

- Each discovery can include a single equipment type.
- Equipment with names or IP addresses that is already monitored is not rediscovered.

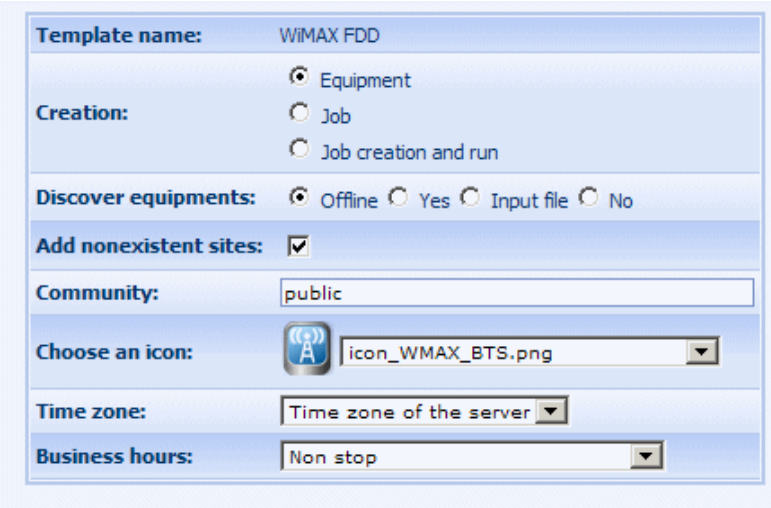


Figure 4-2: Creating New Equipments from Template - WiMAX FDD

6 In the Creation section make sure the Equipment option is selected.

7 In the Discover Equipments field select either:

» No - to add equipments manually (see Step 9)

» Input File - to upload a text file (See Step 10)

The Yes and Offline options are not applicable for WiMAX equipment.

8 In the Community section, override the Read community setting with the relevant one for your network.

9 If you selected No:

a Click **OK**. The system returns to the main network list.

For example:

◊ equipment_1;;192.168.120.120;4M

◊ equipment_2;second site;192.168.121.121

◊ equipment_3;;192.192.192.192;4M

b Click **[Add new]** to add as many equipments as required.

c In each line enter: BTS name (free text up to 46 characters), site name, description and IP address (see Figure 4-3). Name and IP address are mandatory.

INFORMATION

Searching and displaying of devices in StarQuality is done by names only, therefore it is advised to keep a systematic naming convention, for example, it is recommended to name each device by its IP.

10 If you selected Input File:

a Prepare a text file, in which each line signifies a BTS. Each line entry includes three columns in the following order: equipment name, equipment description (optional); IP address and Site name (optional). Allowed delimiters: semicolon (;) or tab. Save it as a *.txt* type file.

b In the StarQuality application click **Browse** to select this file.

c Click **OK**. The system returns the imported equipment into an editable table as shown below:

[add new]	Equipment name	Site name	Equipment description	IP address	Template name
[del]	FDD_08	FDD TFTP	BS 8	192.168.100.135	WiMAX FDD TFTP
[del]	FDD_12	FDD TFTP	BS 12	192.168.70.31	WiMAX FDD TFTP

Figure 4-3: Adding Equipment from an Input File

d Make any adjustments by editing the table. You can add new entries, delete existing entries or modify their content.

11 Click **OK**; the system searches and discovers each existing and online BTS. For each discovered BTS a success message appears; For each unsuccessful discovery an error massage is displayed and the system continues to the next device.

12 When the discovery is complete, click **Back** to return to the network site.

13 Verify that all the equipments are not colored red, which means that their data is being collected.

14 Verify that for each BTS, a matching site has been created, named as the BTS with the postfix "SUs" (i.e, <btsname SUs>).

15 In case of BTS SNMP collection (FDD 3.5/3.6 or BreezeACCESS VL), this SU site is colored red, which means that no SU under it is being collected yet. In this case, activate Data Collection for up to 10 SUs as described in Section 4.2.3.

4.2.2 Setting Automatic Discovery of Equipment from AlvariSTAR

StarQuality can be set to automatically access the AlvariSTAR server and perform discovery of WiMAX equipment discovered in AlvariSTAR.

If an equipment is found in both AlvariSTAR and in StarQuality, StarQuality synchronizes the WiMAX equipment details (name, SNMP parameters etc.) according to the data in AlvariSTAR.

If a WiMAX equipment is found in AlvariSTAR only, StarQuality discovers it and starts collecting from it.

A daily log file of the discovery cycles is placed under */opt/starquality/logs* and named according to the following convention:

AS2SQ.<yyyymmdd>.log. For example: *AS2SQ.20110605.log*.

To configure Auto-discovery:

1. Verify that the following is available:
   - The AlvariSTAR server is active.
   - The AlvariSTAR server includes a license containing the required license feature (service activation NBI)
   - Port 10161 is enabled between the AlvariSTAR and StarQuality machines
2. From Settings select Servers > Server Configuration. The Server Configuration window is displayed.

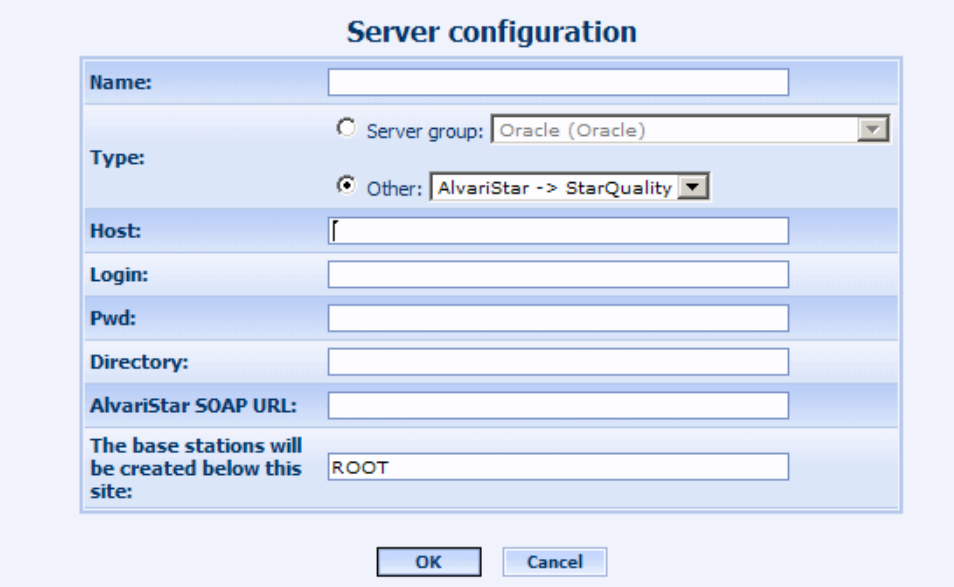


Figure 4-4: Adding a New AlvariSTAR -> StarQuality Module

3 Fill in the following information:

- **Name:** Free text, for example: auto discovery
- **Type**: Select Other and AlvariSTAR -> StarQuality
- **Host**, **Login**, **Pwd** and **Directory**: Copy the values from any other valid collector
- **AlvariSTAR SOAP URL**: Use any of the following:
  - http://IP.address:8080/bwanmsws/
  - http://IP.address:8080/bwanmsws/entitymanager/
  - http://IP.address:8080/bwanmsws/configurationservice/
- **The Base stations will be created below this site**: ROOT

4 Click **OK**. The system allocates a site with the matching collector type: 4Motion, Extreme, BreezeACCESS, etc. below the specified site.

INFORMATION

If a site with the same collector type already exists, the newly discovered equipment will be added to it. Otherwise, a new site with the matching collector type will be created and the newly discovered equipment will be placed there.

5 Activate the collector: From Settings select Start/Stop/Status, select the newly created site and click **[Start]**.

4.2.3 Activation/Deactivation of Data Collection

When you create a site, data collection is by default activated for all AUs and SUs (except for SNMP - FDD ver3.5/3.6 and BreezeACCESS VL SUs). The following procedure describes how to activate or stop data collection for any equipment type. Use this procedure also to activate data collection for NMP - FDD ver3.5/3.6 and BreezeACCESS VL SUs.

To activate or deactivate data collection for any equipment type:

1 Click the site icon to enter the site.

2 For each equipment repeat the following:

a Click **[edit]** next to the equipment you want to activate. The following window is displayed (measurement types themselves may vary according to the specific equipment: SU, BTS, Server Health element):

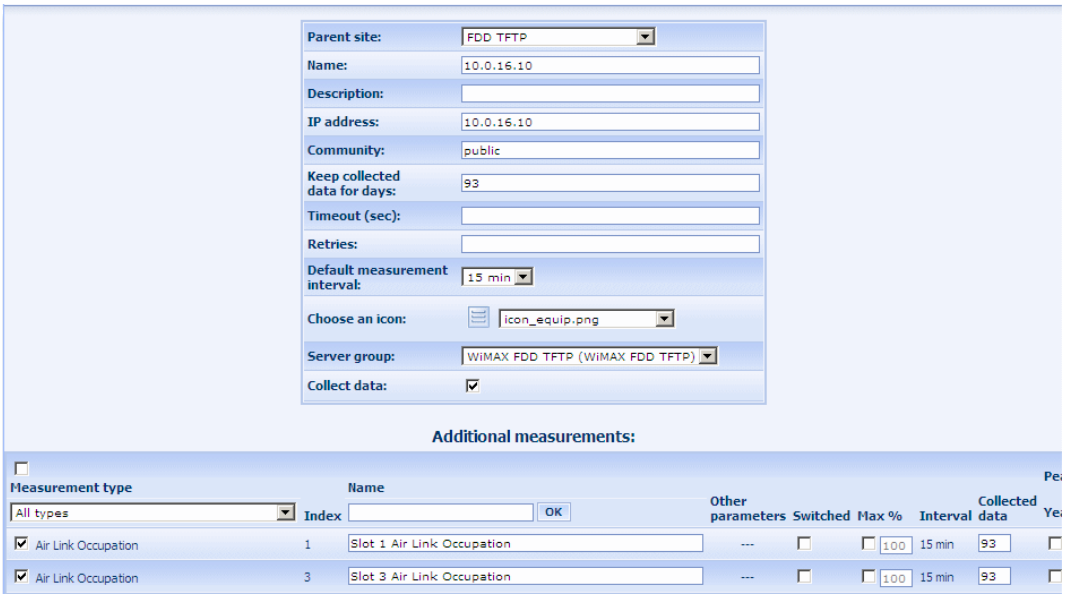


Figure 4-5: Activating Data Collection

b Select or deselect the Collect Data check-box at the bottom of the upper table.

c Select or deselect the measurements you want to activate/deactivate in the lower table.

d Click **OK**.

e Go back one level in the navigation path and verify that the equipment line is no longer red (activated) or is red if deactivated (Figure 4-6).

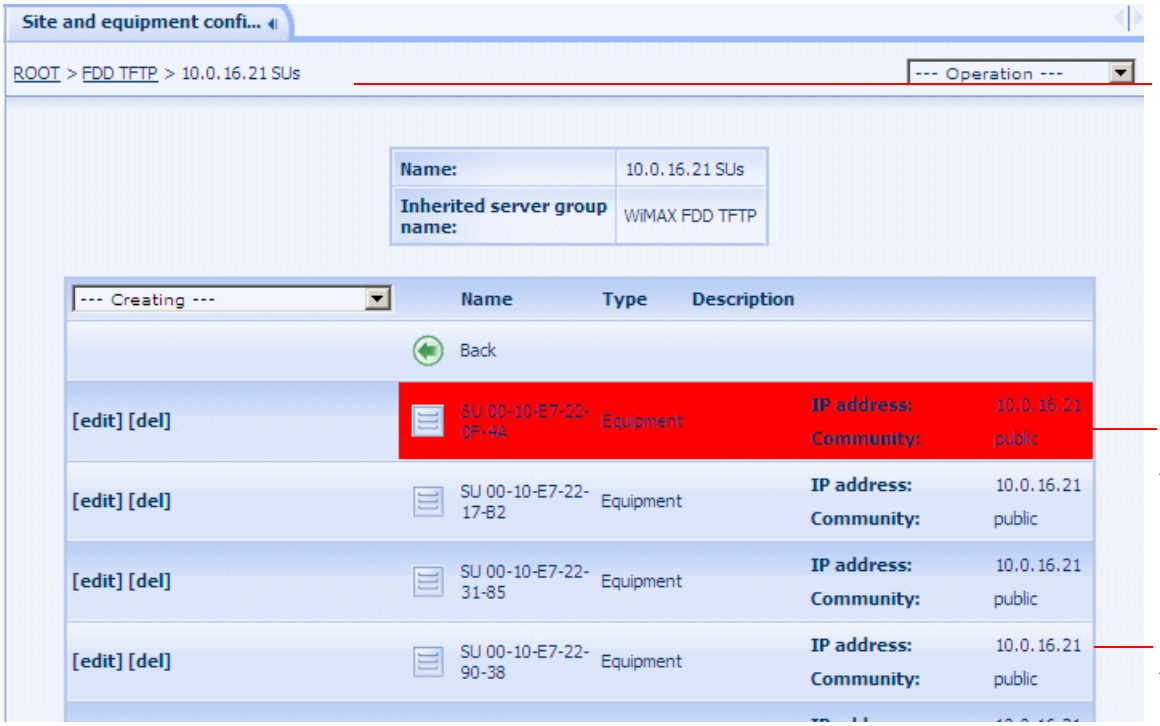


Figure 4-6: Data Collection Status

4.3 Discovery of Equipment under a Server-Health Site

This section describes how to add equipment related to server health to the StarQuality and initiate the data collection from them. For these equipment types, only a single device is discovered each time; that is, there is no multiple discovery.

You can use a template or create new equipment from scratch. The procedures in this section describe the recommended way of creating equipment from templates.

For more information refer to "Site and Equipment Configuration" on page 233, and "Discovery of WiMAX Devices" on page 135.

To add an AlvariSTAR server:

1. Make sure the following prerequisites are available:
   - Setup and configuration:
     - Network connection between StarQuality and AlvariSTAR machines
     - AlvariSTAR ver.4.0 and later
   - Information:
     - AlvariSTAR machine IP address
     - Read community of AlvariSTAR SNMP server (if not changed, the default is: "public")
2. From Settings select Site and Equipment Configuration.
3. Click the **Server Health** icon to enter its site.
4. From the Creation drop down menu select Add Equipment from Template.
5. Select the template upon which to base the equipment setup: AlvariSTAR.
6. Click **OK**. A basic setup template page is displayed.

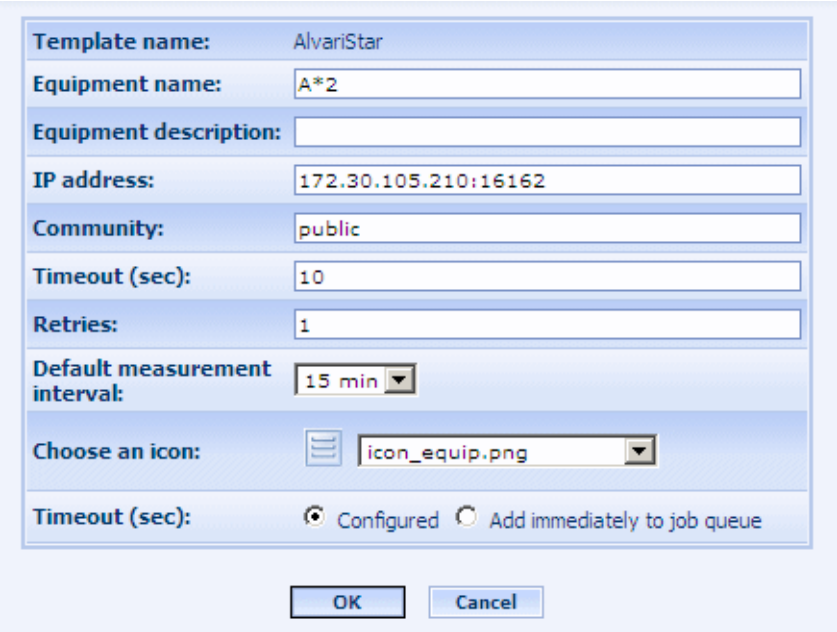


Figure 4-7: Creating New Equipment - AlvariSTAR

7 Fill in the required information (for parameter information and description refer to "Discovery of WiMAX Devices" on page 135):

- Name and description - free text
- IP address: <ip address>:<16162>
- Community: public
- Leave all other fields with their default values.

8 Click **OK**; Discovery is running and can take up a few minutes. The following window is displayed. The green field means that collection is activated by default.

Figure 4-8: Data Collection Active

9 If you wish to edit the specific counters collected, select Modify Equipment from the Operations drop-down menu.

10 choose specific measurements or all measurements by selecting the corresponding check-boxes.

11 Scroll down and click **OK** to implement changes.

To add an Oracle database server:

1. Make sure the following prerequisites are available:
   - Setup and configuration:
     - Network connection between StarQuality and Oracle machines
   - Information:
     - Oracle TNS name - in case StarQuality and Oracle are on the same machine: Oracle server TNS; in case StarQuality and Oracle are on separate machines: Oracle client TNS (TNS name is defined in the file *tnsnames.ora* placed in the directory: ORACLE_HOME\NETWORK\ADMIN
     - Password of Oracle SYSTEM user
2. From Settings select Site and Equipment Configuration.
3. Click the **Server Health** icon to enter its site.
4. From the Creation drop-down menu select Add Equipment from Template.
5. Select the template upon which to base the equipment setup: Default Oracle.
6. Click **OK**. A basic setup template page is displayed.

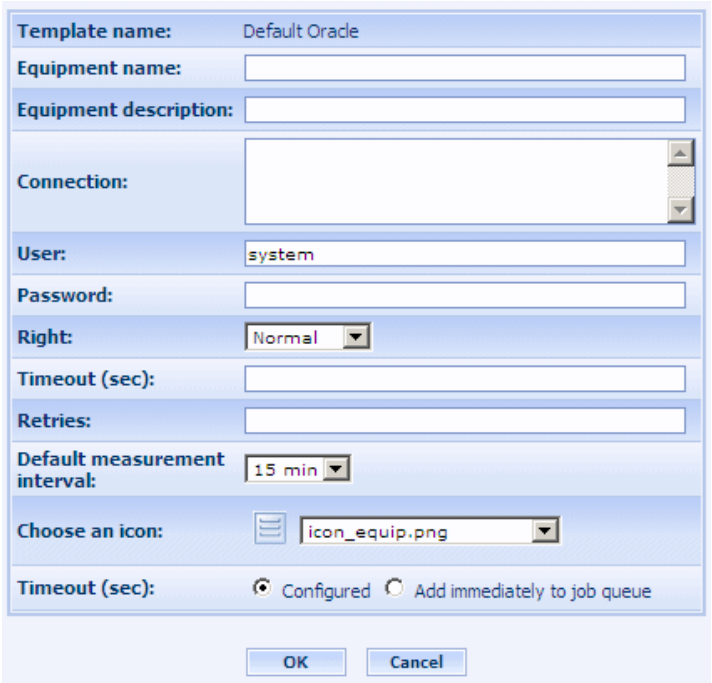
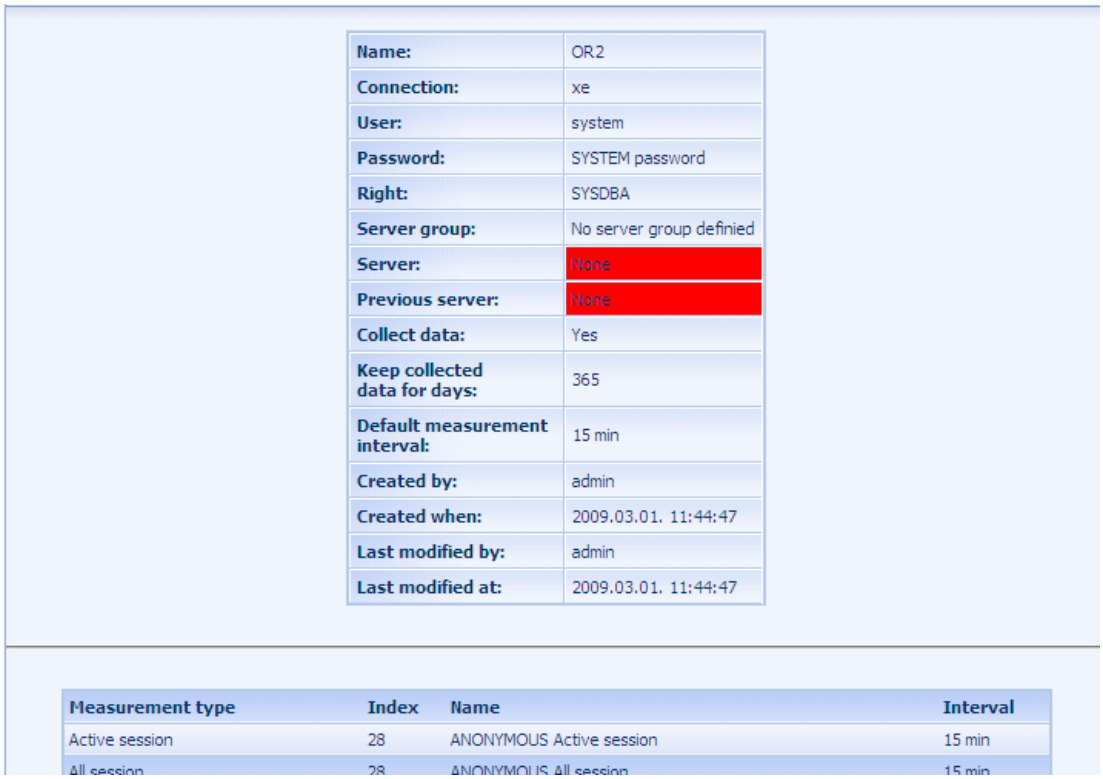


Figure 4-9: Default Oracle Template

7 Fill in the required information (for parameter information and description refer to "Discovery of WiMAX Devices" on page 135):

- Name and description - free text
- Connection: <TNS name>
- User: system
- Password: SYSTEM password
- Right: SYSDBA/SYSOPER/Normal, according to security preferences
- Leave all other fields with their default values

8 Click **OK**; Discovery is running and can take up a few minutes. The following window is displayed. Red fields mean that collection is not activated by default.



Name:	OR2
Connection:	xe
User:	system
Password:	SYSTEM password
Right:	SYSDBA
Server group:	No server group definied
Server:	None
Previous server:	None
Collect data:	Yes
Keep collected data for days:	365
Default measurement interval:	15 min
Created by:	admin
Created when:	2009.03.01. 11:44:47
Last modified by:	admin
Last modified at:	2009.03.01. 11:44:47

Measurement type	Index	Name	Interval
Active session	28	ANONYMOUS Active session	15 min
All session	28	ANONYMOUS All session	15 min

Figure 4-10: Network Discovery Results (Oracle)

9 To start collecting select from the Operations drop-down menu Modify Equipment. The following window is displayed.

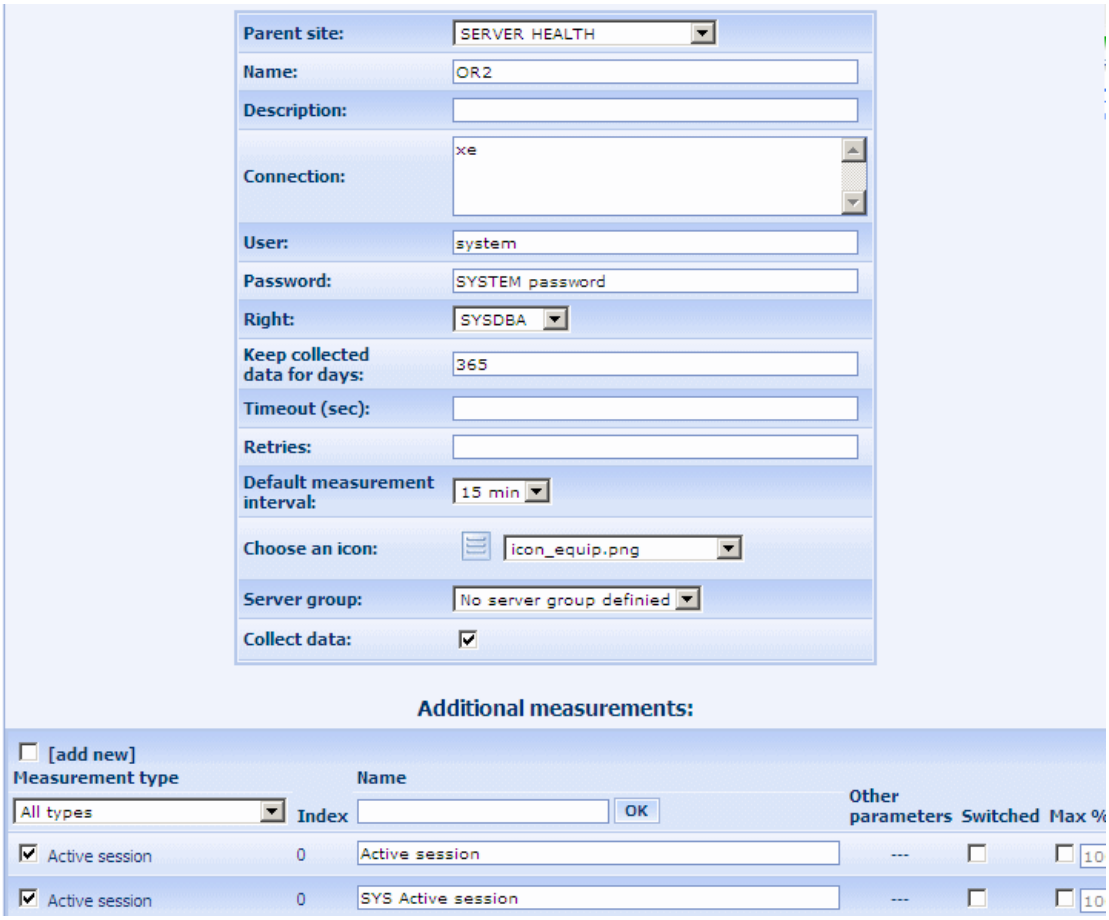


Figure 4-11: Activating Data Collection (Oracle)

10 Change Server Group to Oracle, and choose specific measurements or all measurements by selecting the corresponding check-boxes.

11 Scroll down and click **OK** to implement changes. The Server field turns green which indicates that collection is active.

Name:	OR2
Connection:	xe
User:	system
Password:	SYSTEM password
Right:	SYSDBA
Server group:	Oracle
Server:	Oracle Collector
Previous server:	None
Collect data:	Yes
Keep collected data for days:	365
Default measurement interval:	15 min
Created by:	admin
Created when:	2009.03.01. 11:44:47
Last modified by:	admin
Last modified at:	2009.03.01. 14:07:06

Figure 4-12: Data Collection Active (Oracle)

To add equipment under the UNIX/Linux site:

1 Make sure the following prerequisites are available:

- Setup and configuration:
  - Network connection between StarQuality and UNIX machines
- Information:
  - IP address of UNIX machine
  - UNIX user name and password. The prompt for the user used for discovery must have the following pattern: end with a space or have a >, #, %, or $ character followed by a space.

2 From Settings select Site and Equipment Configuration.

3 Click the **Server Health** icon to enter its site.

4 From the Creation drop down menu select Add Equipment from Template.

5 Select the template upon which to base the equipment setup: Default Unix/Linux.

6 Click **OK**. A basic setup template page is displayed.

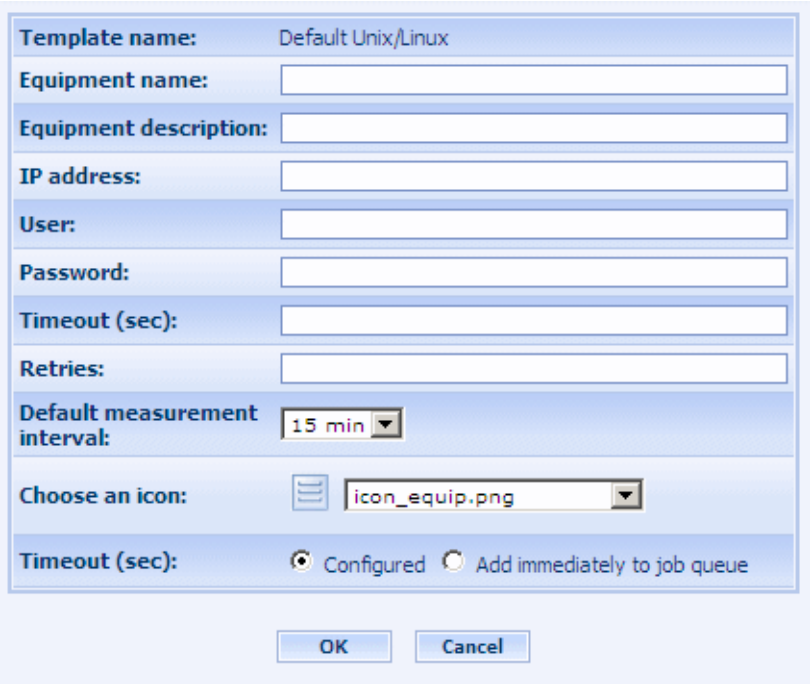
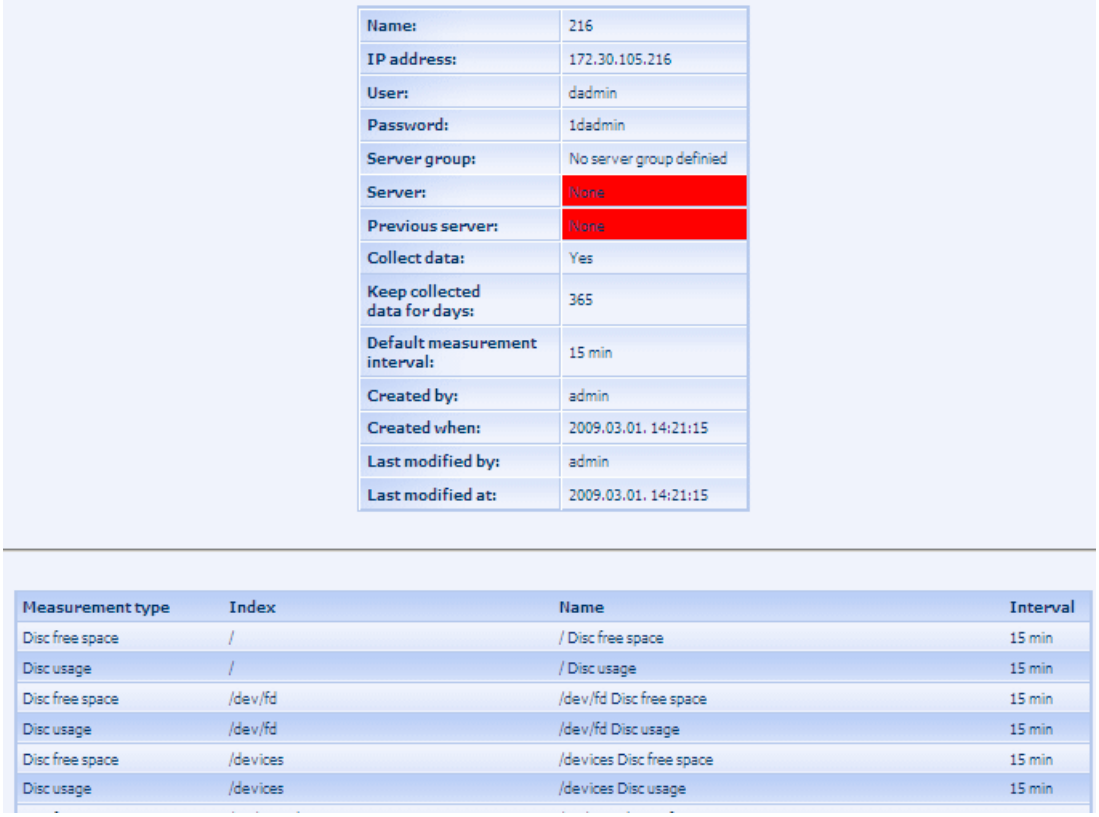


Figure 4-13: Default Unix/Linux Template

7 Fill in the required information (for parameter information and description refer to "Discovery of WiMAX Devices" on page 135):

- Name and description - free text
- IP address: <ip address>
- User: <root>
- Password: <root password>
- Leave all other fields with their default values

8 Click **OK**; Discovery is running and can take up a few minutes. The following window is displayed. Red fields indicate that collection is not activated by default.



Name:	216
IP address:	172.30.105.216
User:	dadmin
Password:	1dadmin
Server group:	No server group definied
Server:	None
Previous server:	None
Collect data:	Yes
Keep collected data for days:	365
Default measurement interval:	15 min
Created by:	admin
Created when:	2009.03.01. 14:21:15
Last modified by:	admin
Last modified at:	2009.03.01. 14:21:15

Measurement type	Index	Name	Interval
Disc free space	/	/ Disc free space	15 min
Disc usage	/	/ Disc usage	15 min
Disc free space	/dev/fd	/dev/fd Disc free space	15 min
Disc usage	/dev/fd	/dev/fd Disc usage	15 min
Disc free space	/devices	/devices Disc free space	15 min
Disc usage	/devices	/devices Disc usage	15 min

Figure 4-14: Network Discovery Results (Unix/Linux))

9 To start collecting select from the Operations drop-down menu Modify Equipment. The following window is displayed.

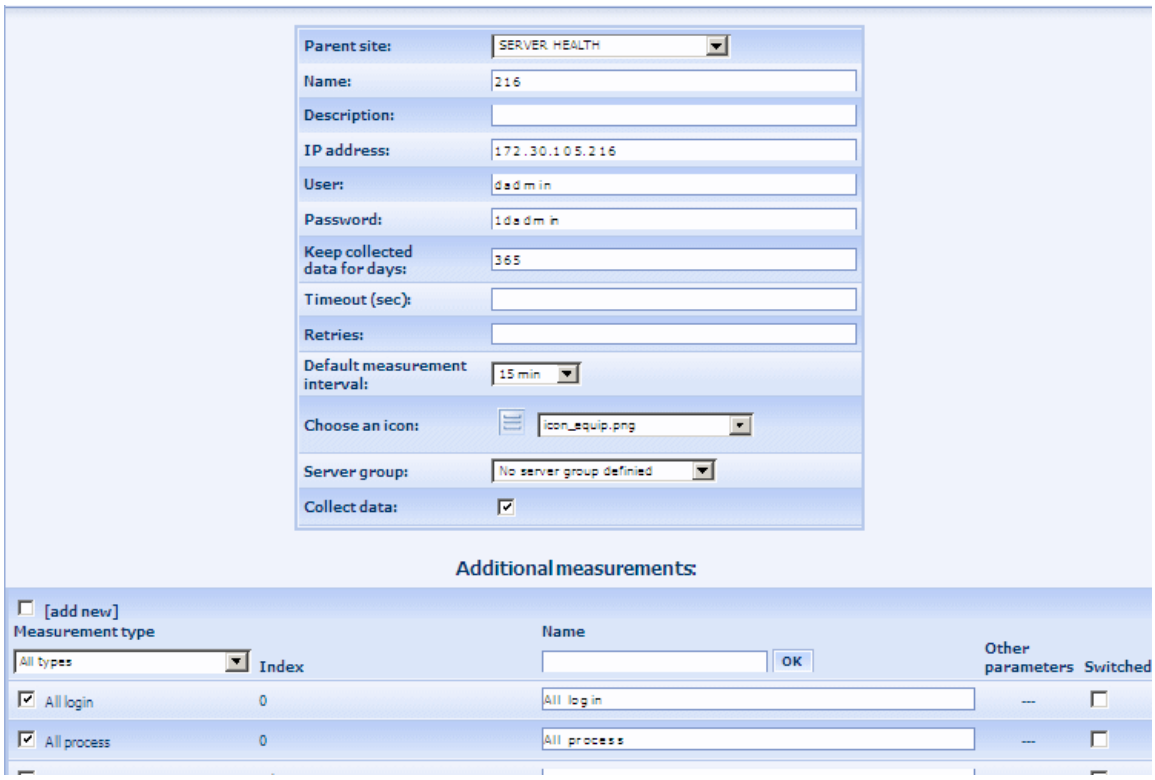


Figure 4-15: Activating Data Collection (UNIX)

10 Change Server Group to Unix/Linux, and choose specific measurements or all measurements by selecting the corresponding check-boxes.

11 Scroll down and click **OK** to implement changes. The Server field turns green which implies that collection is active.

Name:	216
IP address:	172.30.105.216
User:	dadmin
Password:	1dadmin
Server group:	Unix/Linux
Server:	Unix/Linux Collector
Previous server:	None
Collect data:	Yes
Keep collected data for days:	365
Default measurement interval:	15 min
Created by:	admin
Created when:	2009.03.01. 14:21:15
Last modified by:	admin
Last modified at:	2009.03.01. 14:31:50

Figure 4-16: Data Collection Active (UNIX)

Chapter 5 - Viewing Measurements

In this chapter:

- "Introduction" on page 154
- "WiMAX Equipment Measurements" on page 156
- "Measurements Browsing Options" on page 157
- "Measurements Display Options" on page 158
- "Viewing Measurement Data" on page 163
- "Searching Measurements" on page 167
- "Saving Items as Submenus" on page 170
- "Setting Trendlines to Graphs" on page 171

5.1 Introduction

Viewing measurements is available using a configurable quick menu at the top panel for displaying and navigation. New elements can be added to the page using the Settings > Customization menu (see "Customization" on page 248).

The Browser is also available for displaying, navigation and filtering in the site-equipment-measurement hierarchy, and it shows the measurements according to the measurement type.

Only those objects (sites, equipments, or measurements) for which the user has permissions are accessible.

The figure below shows the Browser and the Icon view of the selected hierarchy level (Root).

Figure 5-1: The Measurements Main Menu Item with the Browser and the Icon View

The structure of sites is illustrated in the following figure:

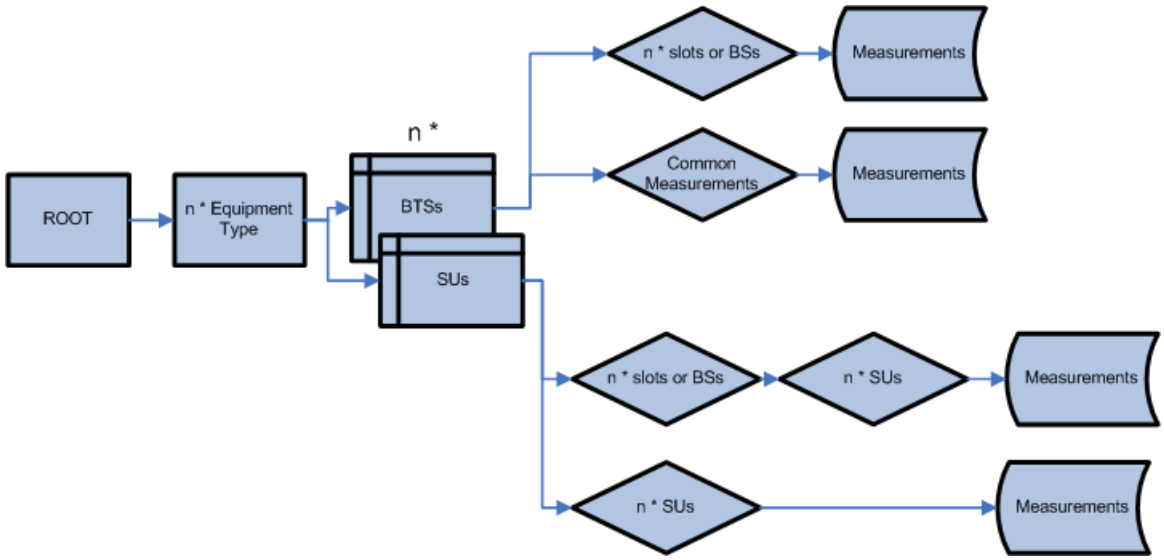


Figure 5-2: Hierarchy of Sites

5.2 WiMAX Equipment Measurements

KPIs (Key Performance Indicators) exist for three types of entities:

- Slot (also referred to as AU, sector, BS)
- SU (also referred to as MS, CPE)
- NPU (also referred to as BTS, in “common measurements”)

For specific device information refer to Chapter 11.

5.3 Measurements Browsing Options

You can find a specific device data using three methods:

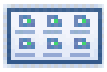
- Navigating the path from the Measurement menu - click **ROOT** or **Network/Monitored SUs** sites and then click the equipment icons.
- Searching for a specific equipment - see "Searching Measurements" on page 167
- Creating a specific sub-menu as a shortcut - see "Saving Items as Submenus" on page 170

5.4 Measurements Display Options

5.4.1 Viewing Options

Click one of the icons in the **View** group to set the element display options in the **View** group (Figure 5-13):

Table 5-1: Element View Options

Icon	Tooltip	Description
	Icons	The elements of the hierarchy level under the selected item appear with a big icon and name, up to 5 items in a row (as in Figure 5-1). Click on the icons to continue the navigation
	List	The elements appear with a small icon and name, thus allowing many objects on a small screen.
	Detailed	Elements are listed under each other with a small icon, name and description.
Display Deleted		Adds to the currently displayed measurements: ■ Measurements from deleted devices ■ Measurements that were deleted or modified (formula or unit) between StarQuality versions

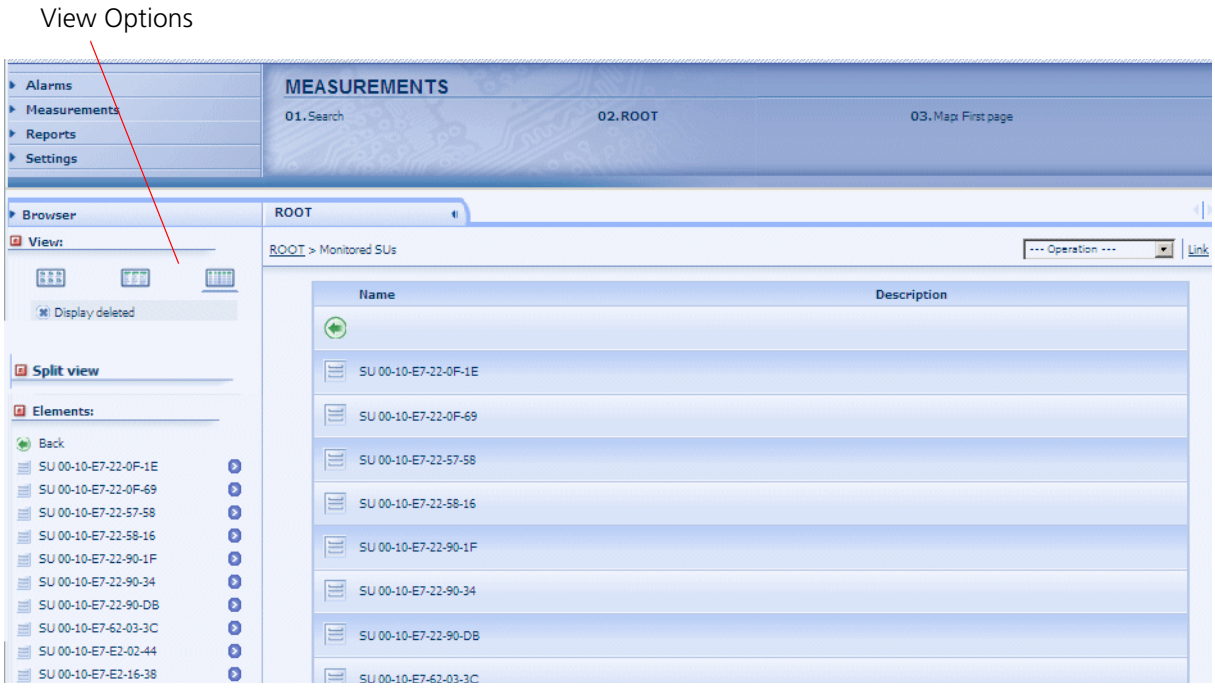


Figure 5-3: Navigation between Measurements: Detailed View

5.4.2 Displaying Elements Side-by-Side

You can display two lists of elements in the main area and compare elements.

To enable this option click on the **Split view** icon. A drop-down list is displayed, enabling to select what to display on the right side of the main area. There are two options:

- **Search**: a search page similar to the Measurements' Search is displayed. Search for an object and click **OK**. The selected object appears on the right panel, with a red line on the left border
- Select any available tab from the drop-down list. An item with a red background means that it cannot be opened from the Measurement menu or is already in the split view mode). You can also select the currently used tab, in which case the information is duplicated.

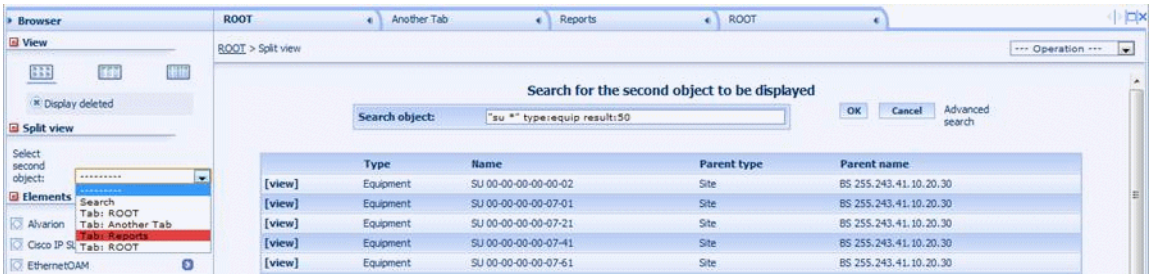


Figure 5-4: Split View Options

As in the normal view mode, you can navigate the hierarchy, display charts, etc. For easy location, the exact path is displayed at the top of each side.

When the view is split, the drop-down menu changes into the following options:

- **Close split view**: Select which panel to close to return from split view to normal view.
- **Scrolling**:
  - Individual - scroll each side separately
  - Common - scroll both sides simultaneously

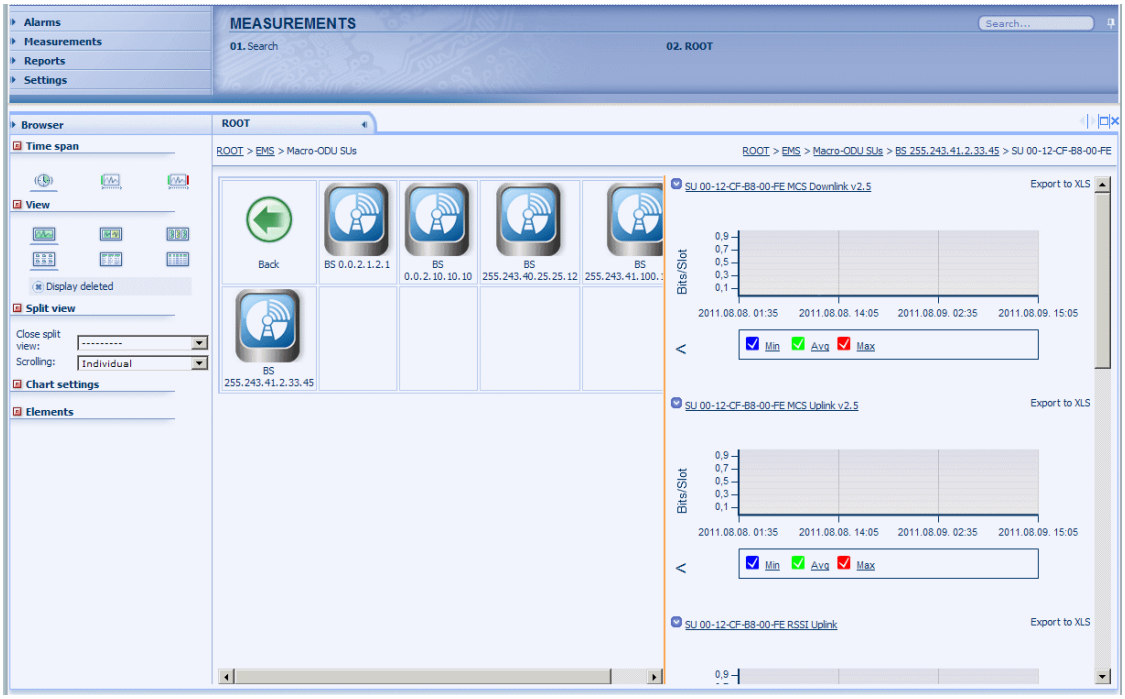


Figure 5-5: Split View

5.4.3 Element Browsing Options

The **Elements** group in the Browser displays the elements as a list, marked with a mini icon and a > symbol.

If there are too many items in the current level, the Browser automatically groups them. Therefore the elements in the main part of the display and in the **Elements** group of the Browser pane are not necessarily corresponding.

To browse elements:

Do one of the following:

- Click on the name of the object to continue the navigation on the left side.
- Click on the ? symbol to browse to the selected site or equipment. The elements under the selected equipment also appear in the currently active tab.
- In case of many equipments, click on a group to expand it. The system stays at the same level, so clicking does not mean a hierarchy level has changed.
- Click **Measurement Types** to navigate the hierarchy and display only the elements that include the selected measurement type.

5.4.4 Operations Drop-Down Menu Options

The following functions are available for viewing measurement data (see Figure 5-6):

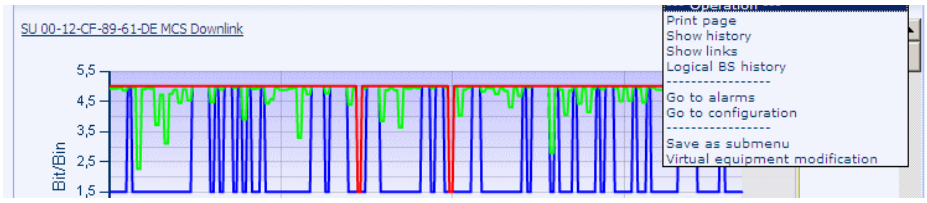


Figure 5-6: Measurements Operation drop-down Menu

- **Print Page** - sends the page to printer
- **Show history** - the application tracks the navigation of the user in the Measurements and in the Alarms menu and builds a history log from it. Each tab has its own log and each log entry contains the visited object, along with the used submenu and the selected date and time period. You can view this history log and either go back to a previous entry by clicking on the [view] link or open it in a new tab by right-clicking on the [view] link.

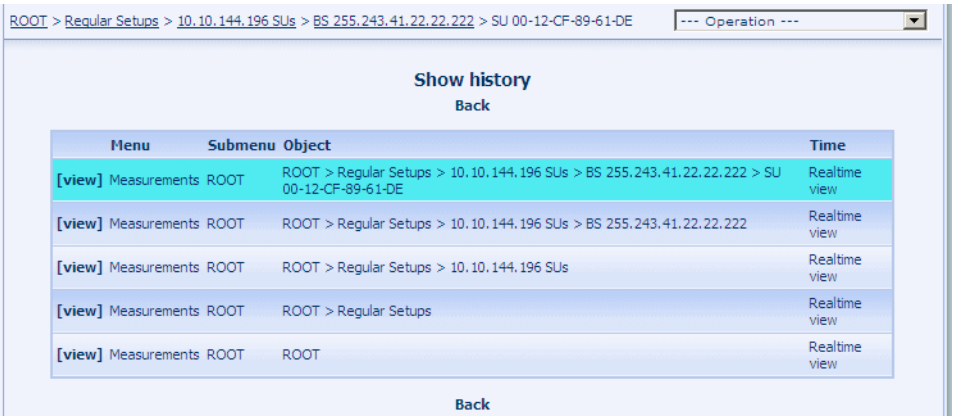

ROOT > Regular Setups > 10.10.144.196 SUs > BS 255.243.41.22.22.222 > SU 00-12-CF-89-61-DE
--- Operation ---
Show history
Back
Menu Submenu Object Time
[view] Measurements ROOT ROOT > Regular Setups > 10.10.144.196 SUs > BS 255.243.41.22.22.222 > SU 00-12-CF-89-61-DE Realtime view
[view] Measurements ROOT ROOT > Regular Setups > 10.10.144.196 SUs > BS 255.243.41.22.22.222 Realtime view
[view] Measurements ROOT ROOT > Regular Setups > 10.10.144.196 SUs Realtime view
[view] Measurements ROOT ROOT > Regular Setups Realtime view
[view] Measurements ROOT ROOT Realtime view
Back

Figure 5-7: Show History

- **Show links** - Displays three links, which jump directly to the currently viewed object when a new browser window is opened. The difference between the three links are the level of settings stored in them:
  - ◊ Object only - stores only the location of the object itself
  - ◊ Object with date and time - stores the selected date and time interval or the real-time display state
  - ◊ Object with every setting - stores every setting made in the Browser area.

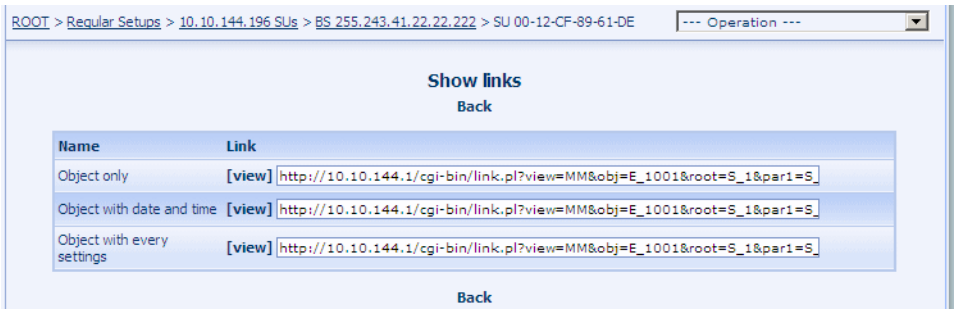


Figure 5-8: Show Links

- **Go to Alarms** - jumps to the Alarms main menu items while keeping the selected hierarchy item.
- **Logical BS History** (for 4Motion only) - Displays the BSs to which the a CPE (SU) has been connected during mobility, within the measured time (see Figure 5-9).

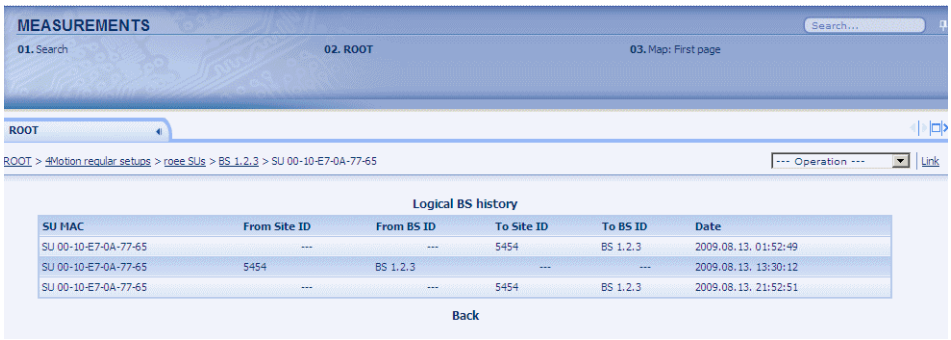


Figure 5-9: Logical BS History Window

- **Go to Configuration** - jumps to the Settings > Site and System Configuration page.
- **Save as submenu** - adds a submenu item at the top panel (see "Saving Items as Submenus" on page 170).

5.5 Viewing Measurement Data

After reaching the equipment level using one of the navigation methods described above, the measurement results can be reviewed in chart format by selecting the concrete equipment.

You can export the measurement data to Excel by clicking the **Export to XLS** link at the top-right corner of each chart.

5.5.1 Viewing Measurements by Time Span

Click one of the icons to define the time span of measurements to be displayed:

Table 5-2: Time Span Options

Icon	Tooltip	Description
	Realtime view	The data is updated periodically
	Historical view by date	A calendar is displayed. Select the desired day, week, month, and year to display measurements for that time span
	Historical view by time	Specify the time interval (hours, seconds, etc.)

Click on a given point of the graph to display the data in finer detail (zoom in to a selected time instant).

Click before the left edge or after the right edge of the graph, respectively to move the selected time interval backwards and forwards.

5.5.2 Chart Display Options

Because of minimizing the required chart drawings, StarQuality draws only the first 20 charts, and the others are visible only when scrolling down the page.

Click one of the icons to set the chart display options in the **View** group (Figure 5-10):

Table 5-3: Chart Display Options

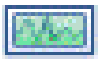
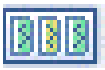
Icon	Tooltip	Description
	Large Charts	The charts appear in one column
	Medium Charts	The charts appear in two columns

Table 5-3: Chart Display Options

Icon	Tooltip	Description
	Small Charts	The charts are arranged in a three column table
Display Deleted		Adds to the currently displayed measurements: ■ Measurements from deleted equipments ■ After StarQuality upgrade - measurements from previous versions. Charts of previous versions are marked with a special suffix in their names.

A chart always uses the whole available area, that is, if you hide the menu system using the expand page icon, or change the shape of the Browser window, StarQuality redraws the chart(s) accordingly. However, you can collapse/expand charts individually, using the Expand/Collapse. StarQuality remembers the choice for every chart separately. You can delete these settings and also change the default behavior of the charts page from Settings > Customization > Preferences ("Setting Preferences" on page 248)

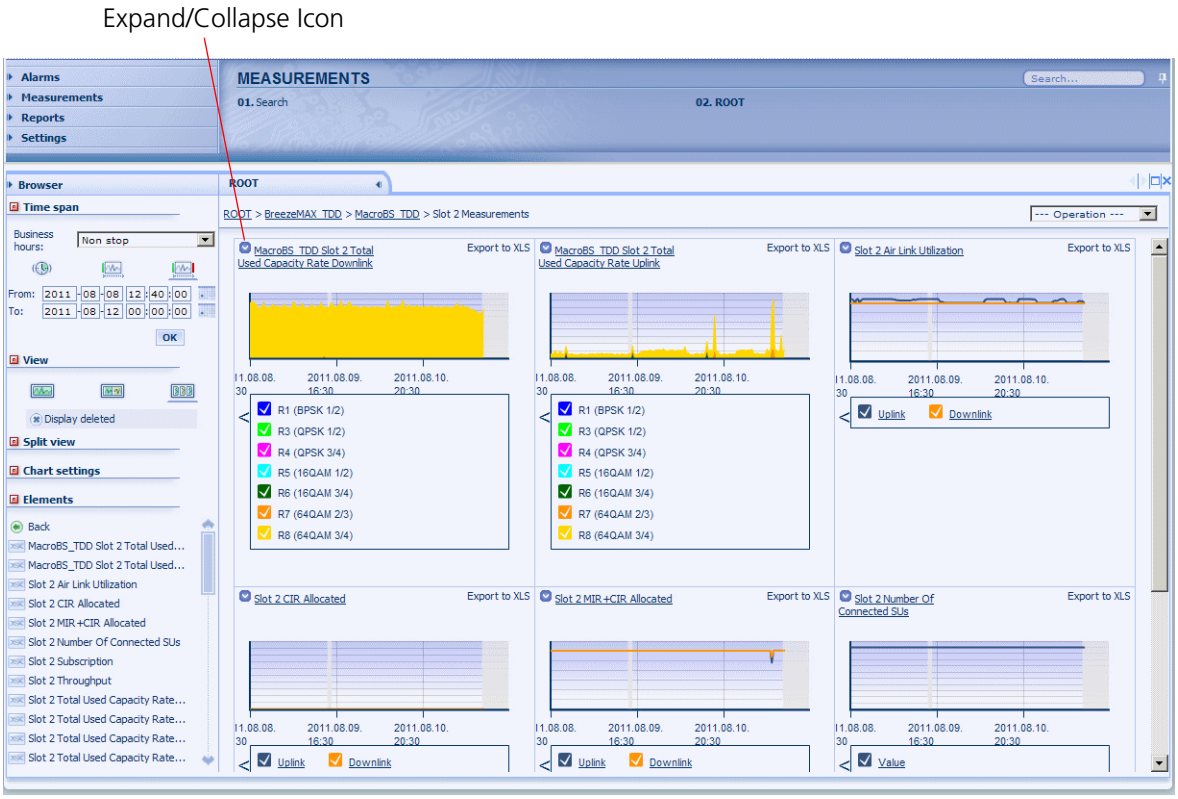


Figure 5-10: Measurements - Small Charts

5.5.3 Chart Settings

Using the "Chart Setting" group options, you can define the display preferences

To configure the chart settings:

1 For an individual equipment, in the Measurements browser, click the Chart Settings icon. The Chart settings options are displayed in the browser.

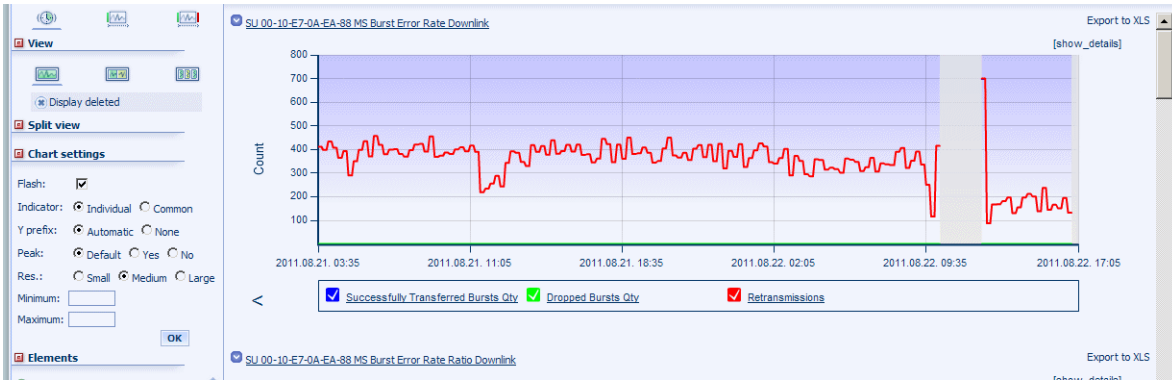


Figure 5-11: Chart Settings in Measurements

2 Set the display options:

» **Flash** - allows displaying the following options (see Figure 5-12):

◊ View or hide specific measurements by clicking their check-box

◊ Mouse-point on a spot displays the date, time and measurement values.

◊ Mouse-point on [Show details] displays the average, last, min. and max. values of the measurement. It also displays any firmware changes for the device.

◊ Right-click and set a trendline calculation for any element.

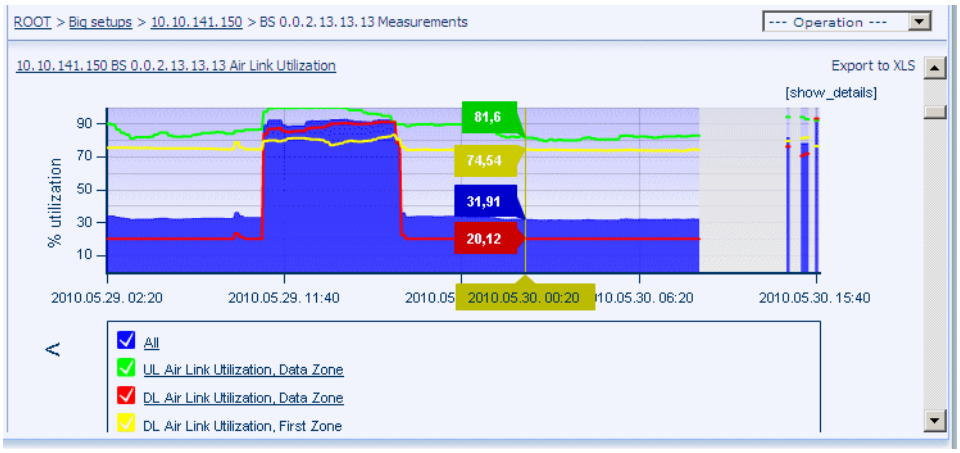


Figure 5-12: Display with Flash Options

- **Peak** - Display the maximum measurement value: Default, Yes, No
- **Resolution** - The number of values displayed on the chart. Higher resolution gives a more accurate view, but if too many data points are displayed on the chart and the values change rapidly, it may be difficult to have a good overview of the displayed data. In this case the use of a lower resolution is recommended.
- **Minimum** and **Maximum** values - Adjust the scale of the chart's vertical axis. You can also use:
  - Percentage values (add the % symbol). In this case 100% corresponds to the average of the displayed values.
  - Measurement units for the displayed data, such as 12.5M, where K, M and G stand for kilo, mega and giga, respectively.

3 Click **OK** to activate your settings.

5.6 Searching Measurements

Search strings are entered frequently in the StarQuality application in order to search by text or to filter the results. There are two types of searching methods: the complex search system, accessed from the Search menu item, and the simple filter system, used in other places.

For the Search menu item, the StarQuality application performs character based, case insensitive "whole text" matching.

Four special characters can be used in the search string:

- _ (underline) or ? (question mark): matches an arbitrary character
- % (percentage) or * (asterisk): matches zero or more arbitrary characters

Therefore, for example, the "_apple%" search string results in all names whose second to sixth characters are "apple" (regardless of case), followed by an arbitrary string of characters, that is, for example "Xapple123", "aApPle", "1AppleTree", etc.

In other cases (filtering, charts editing, etc.), the StarQuality distinguishes small and capital letters, but the [?] and [*] characters do not have the special meaning mentioned above.

In order to search for text that includes a space, include the space in the string for search. For example, "<space>SU" will result in all names including SU with a space proceeding it.

For more information, refer to "Site and Equipment Configuration" on page 233 (in Chapter 9)

Search is relevant to names of sites, equipment, etc. but not to IPs.

You can use the Measurements > Search menu item for displaying actual measurements.

After searching, use the `[view]` link next to the equipment to view the measurement charts.

To start searching for a measurement:

Specify a searching string, using one of the following methods:

1. Simple search: type the string directly in the input field, and click **OK**.
2. Click **Advanced Search**; an advanced window is displayed, which facilitates the construction of the searching string and contains the following insert fields:
   a. **Search to parent name (Yes/No):** If you select "yes" the search finds those objects whose parent name meets the conditions (e.g. the parent is the containing site for a piece of equipment).
   b. **Name:** Name of the object to be searched. The _ and ? characters match an arbitrary single letter, while % and * match an arbitrary string. The expressions in separate lines will be in OR relation with each other.

c **Without:** Characters to be ignored by the system (the format is the same as above)

d **Type:** The type of the object to be searched. Subtype can also be given for equipment, equipment template and measurement type.

e **Display deleted:** Specify whether to add to the currently displayed measurements the measurements from deleted equipments or measurements from previous versions.

f **Results count:** Maximum number of results

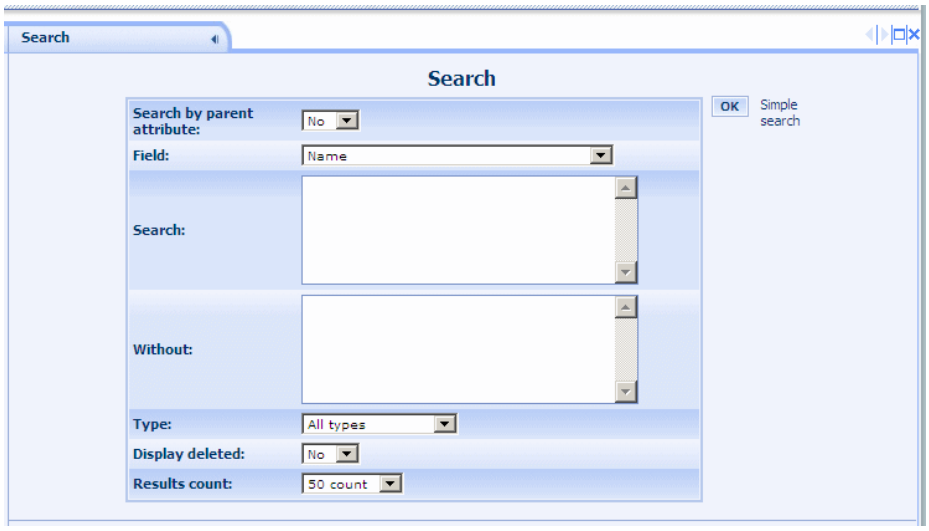


Figure 5-13: Advanced Search

3 Click **OK**; The results are displayed as well as the searching string as it could be given at simple search.

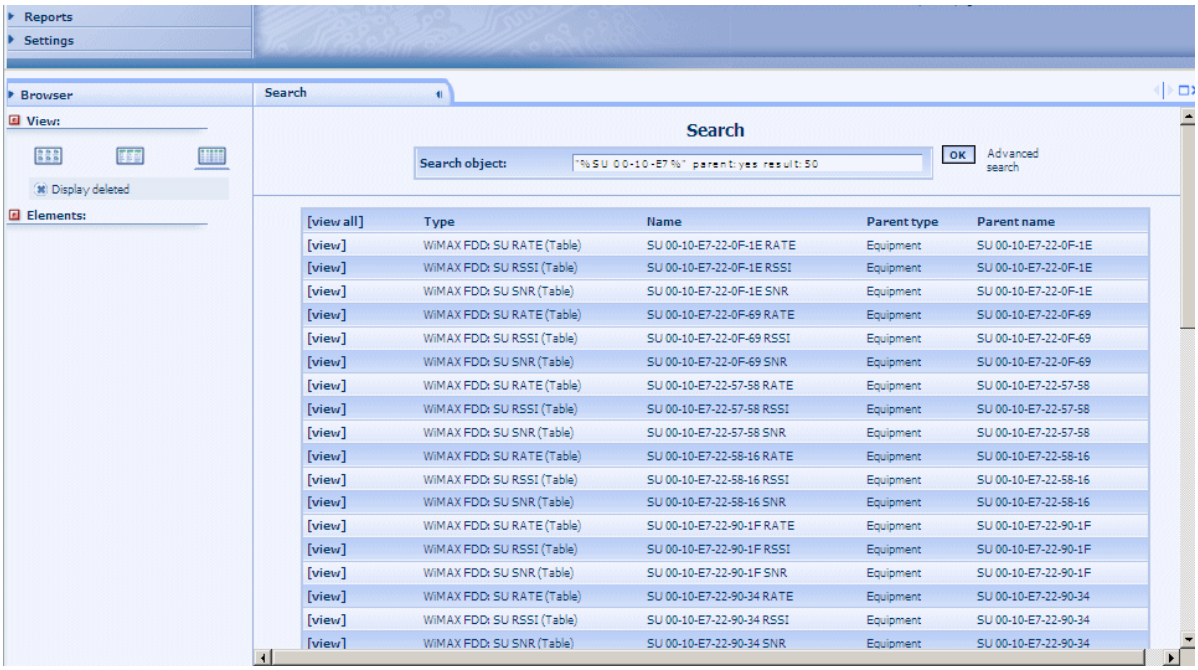

Reports
Settings
Browser
View:
Display deleted
Elements:
Search
Search
Search object:
"%SU 00-10-E7%" parent:yes result:50
OK
Advanced search
[view all] Type Name Parent type Parent name
[view] WiMAX FDD: SU RATE (Table) SU 00-10-E7-22-0F-1E RATE Equipment SU 00-10-E7-22-0F-1E
[view] WiMAX FDD: SU RSSI (Table) SU 00-10-E7-22-0F-1E RSSI Equipment SU 00-10-E7-22-0F-1E
[view] WiMAX FDD: SU SNR (Table) SU 00-10-E7-22-0F-1E SNR Equipment SU 00-10-E7-22-0F-1E
[view] WiMAX FDD: SU RATE (Table) SU 00-10-E7-22-0F-69 RATE Equipment SU 00-10-E7-22-0F-69
[view] WiMAX FDD: SU RSSI (Table) SU 00-10-E7-22-0F-69 RSSI Equipment SU 00-10-E7-22-0F-69
[view] WiMAX FDD: SU SNR (Table) SU 00-10-E7-22-0F-69 SNR Equipment SU 00-10-E7-22-0F-69
[view] WiMAX FDD: SU RATE (Table) SU 00-10-E7-22-57-58 RATE Equipment SU 00-10-E7-22-57-58
[view] WiMAX FDD: SU RSSI (Table) SU 00-10-E7-22-57-58 RSSI Equipment SU 00-10-E7-22-57-58
[view] WiMAX FDD: SU SNR (Table) SU 00-10-E7-22-57-58 SNR Equipment SU 00-10-E7-22-57-58
[view] WiMAX FDD: SU RATE (Table) SU 00-10-E7-22-58-16 RATE Equipment SU 00-10-E7-22-58-16
[view] WiMAX FDD: SU RSSI (Table) SU 00-10-E7-22-58-16 RSSI Equipment SU 00-10-E7-22-58-16
[view] WiMAX FDD: SU SNR (Table) SU 00-10-E7-22-58-16 SNR Equipment SU 00-10-E7-22-58-16
[view] WiMAX FDD: SU RATE (Table) SU 00-10-E7-22-90-1F RATE Equipment SU 00-10-E7-22-90-1F
[view] WiMAX FDD: SU RSSI (Table) SU 00-10-E7-22-90-1F RSSI Equipment SU 00-10-E7-22-90-1F
[view] WiMAX FDD: SU SNR (Table) SU 00-10-E7-22-90-1F SNR Equipment SU 00-10-E7-22-90-1F
[view] WiMAX FDD: SU RATE (Table) SU 00-10-E7-22-90-34 RATE Equipment SU 00-10-E7-22-90-34
[view] WiMAX FDD: SU RSSI (Table) SU 00-10-E7-22-90-34 RSSI Equipment SU 00-10-E7-22-90-34
[view] WiMAX FDD: SU SNR (Table) SU 00-10-E7-22-90-34 SNR Equipment SU 00-10-E7-22-90-34

Figure 5-14: Measurements Search Results

To use the Search results in Measurements:

1. To display the found objects click **[view]**.
2. If the results contain only measurements or charts, to display them together, click on the [view all] link; A page containing the charts is displayed.
3. To create a virtual equipment containing the displayed list of measurements or charts, click **[Save as Virtual Equipment]**.

INFORMATION

This method can substitute the manual selection of measurements and charts under the Customization menu item.

5.7 Saving Items as Submenus

You can create a submenu item under the Measurements menu in order to have a shortcut to a selected item. This may save navigation time and searching for data.

To create a submenu item:

1. Click the equipment icon you want to create a shortcut to.
2. From the Operations drop-down menu select Save As Submenu.
3. Specify if this menu item should appear in Measurement or Alarms or both menus.
4. Click **OK**; the item appears in the Measurements/Alarms menu.

5.8 Setting Trendlines to Graphs

When working in Flash mode, StarQuality enables defining trendlines for displayed measurements.

You can also define thresholds using the trendline values.

To set trendlines:

1 When viewing a result table in Flash mode, right-click on the table itself and select **Set trendline**. The Set Trendline page is displayed.

The parameters in this page may vary depending on the equipment type and measurements

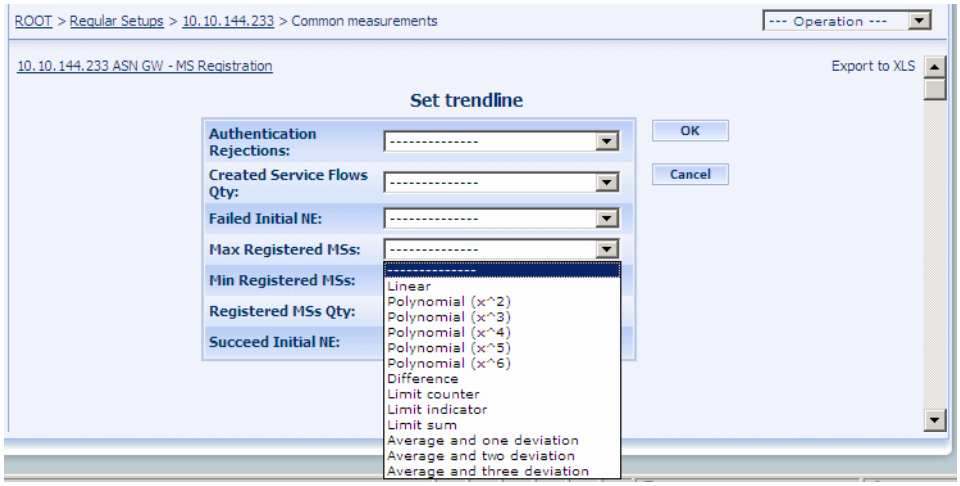


Figure 5-15: Setting Trendlines Window

2 For every entry, select one of the following trendline types from the drop-down list:

- Linear
- Polynomial (x^2) to (x^6)
- Difference - The difference between the current value and the previous value are shown
- Limits - Specify a condition value (e.g. > 10M) and a sample time (e.g the last hour). The following limit trendlines are available:
  - Limit counter - The number of times the condition was true in the time sample is shown as a trendline.
  - Limit indicator - A transparent red area is shown when at least one time the condition was true in the time sample
  - Limit sum - The sum of the measurement values based on the same time interval

- Average and deviation - three trend lines are displayed, showing the average of the element as well the plus and minus deviation. The following trendlines are available:
  - Average and one deviation
  - Average and two deviations
  - Average and three deviations

The following figure shows a few examples of setting trendlines.

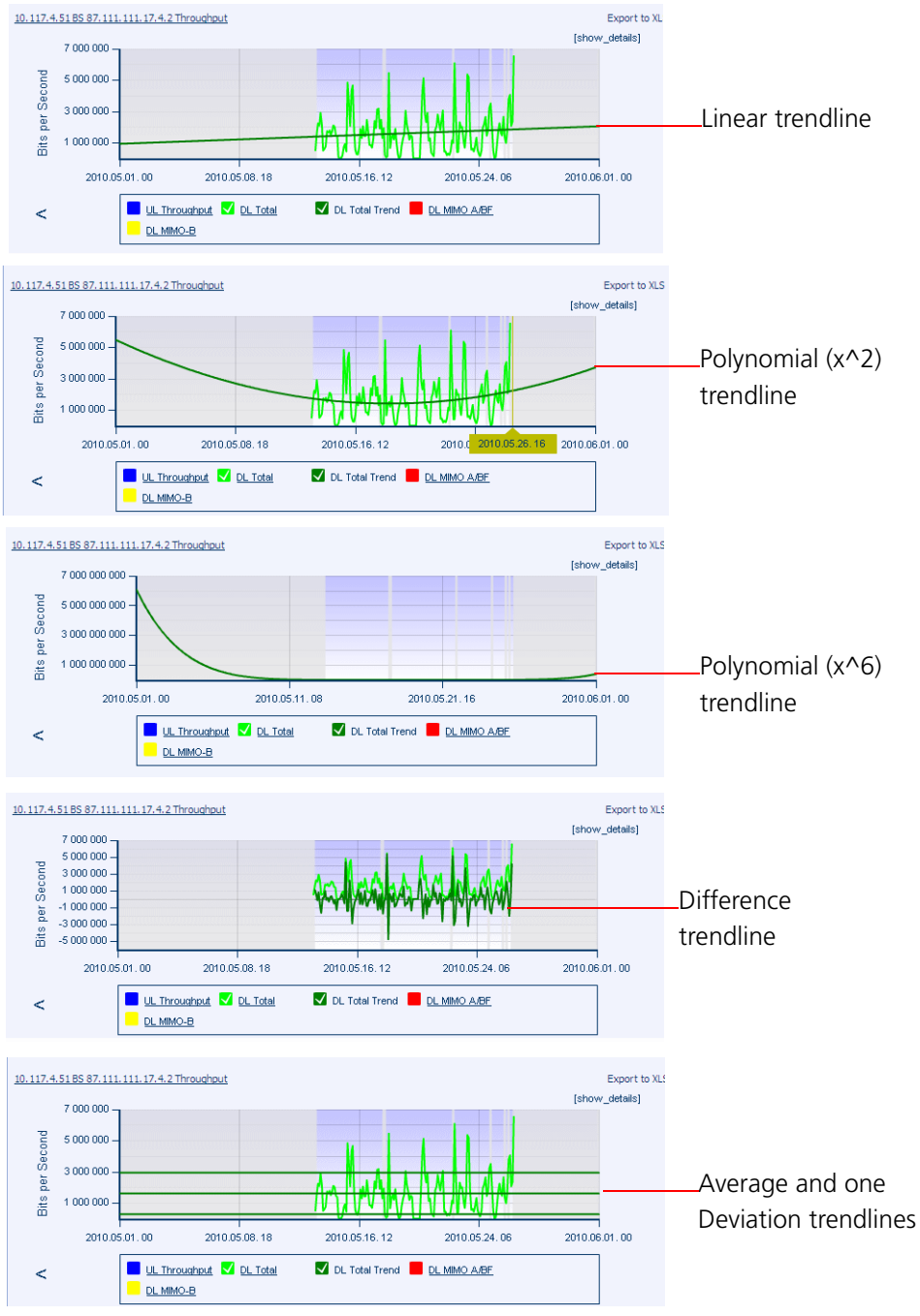


Figure 5-16: Examples of Trendline Settings

Chapter 6 - Setting Alarm Thresholds

In this chapter:

- "Overview" on page 175
- "Creating and Editing Threshold Templates" on page 176
- "Automatic Assignment of Threshold Templates" on page 182
- "Importing and Exporting Threshold Templates" on page 183
- "Assigning Threshold Templates to Equipments" on page 185
- "Editing Thresholds" on page 188
- "Generating the Expression Using Input Fields" on page 191

6.1 Overview

Thresholds are defined in the StarQuality system in order to trigger alarms when their definitions are contravened (violated).

The defined thresholds can be complex expressions using different measurements of the same equipment.

This section describes how to create threshold templates and assign them to equipments.

6.2 Creating and Editing Threshold Templates

Creating thresholds using a template enables the creation of more thresholds, even for the same measurement. First you create the template and then you assign it to equipment. You can also configure the assigned threshold locally.

A threshold template can be configured for automatic assignment for newly discovered NEs (either CPEs or BTSs). This means that when a new NE is introduced into the network, it will be assigned the automatically activated template. Refer to "Automatic Assignment of Threshold Templates" on page 182.

To create a new threshold template:

1 From Settings select Templates > Threshold Templates; The Threshold Template Configuration list is displayed.

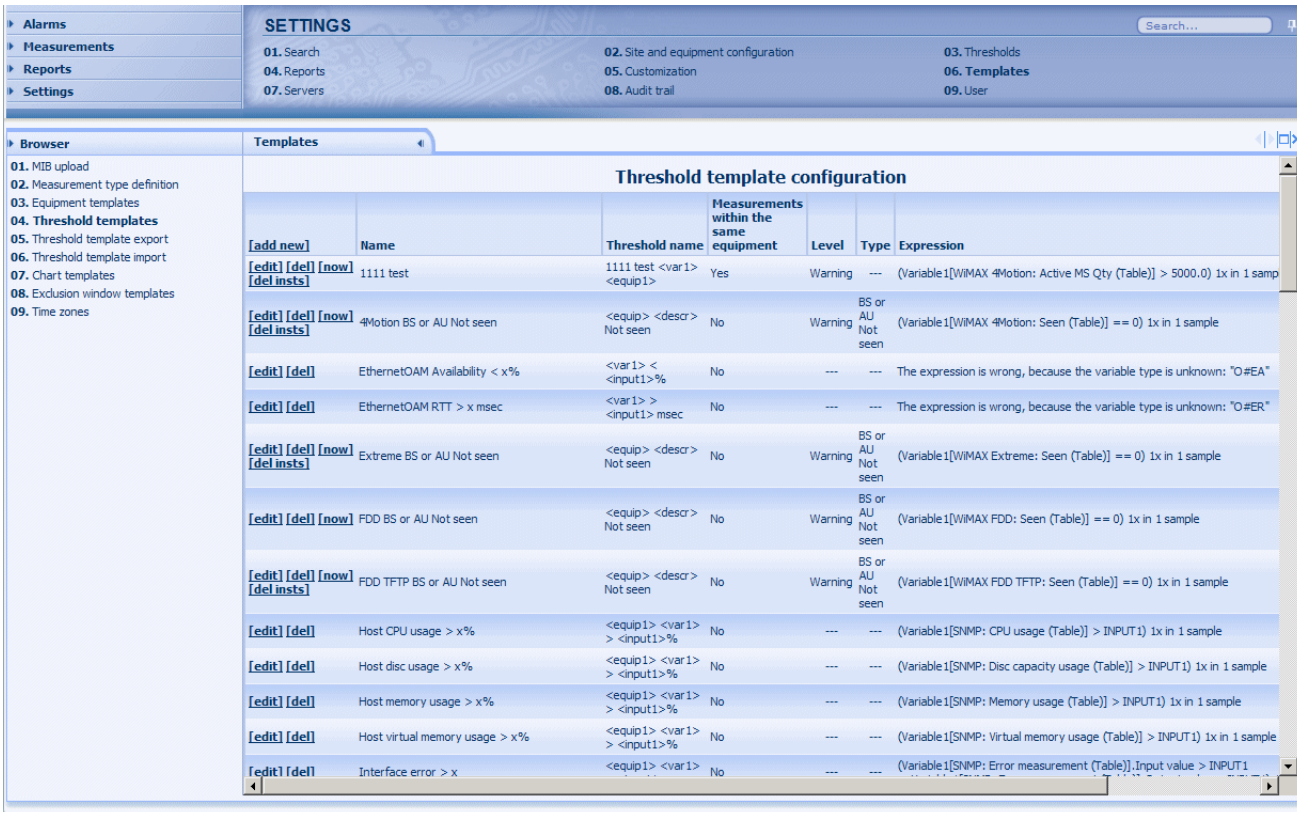

Alarms
Measurements
Reports
Settings
SETTINGS
Search...
01. Search
02. Site and equipment configuration
03. Thresholds
04. Reports
05. Customization
06. Templates
07. Servers
08. Audit trail
09. User
Browser
01. MIB upload
02. Measurement type definition
03. Equipment templates
04. Threshold templates
05. Threshold template export
06. Threshold template import
07. Chart templates
08. Exclusion window templates
09. Time zones
Templates
Threshold template configuration
[add new]
Name
Threshold name
Measurements within the same equipment
Level
Type
Expression
[edit] [del] [now] [del insts] 1111 test 1111 test <var1> <equip1> Yes Warning --- (Variable1[WiMAX 4Motion: Active MS Qty (Table)] > 5000.0) 1x in 1 samp
[edit] [del] [now] [del insts] 4Motion BS or AU Not seen <equip> <descr> Not seen No Warning BS or AU Not seen (Variable1[WiMAX 4Motion: Seen (Table)] == 0) 1x in 1 sample
[edit] [del] EthernetOAM Availability < x% <var1> < <input1>% No --- --- The expression is wrong, because the variable type is unknown: "O#EA"
[edit] [del] EthernetOAM RTT > x msec <var1> > <input1> msec No --- --- The expression is wrong, because the variable type is unknown: "O#ER"
[edit] [del] [now] [del insts] Extreme BS or AU Not seen <equip> <descr> Not seen No Warning BS or AU Not seen (Variable1[WiMAX Extreme: Seen (Table)] == 0) 1x in 1 sample
[edit] [del] [now] FDD BS or AU Not seen <equip> <descr> Not seen No Warning BS or AU Not seen (Variable1[WiMAX FDD: Seen (Table)] == 0) 1x in 1 sample
[edit] [del] [now] [del insts] FDD TFTP BS or AU Not seen <equip> <descr> Not seen No Warning BS or AU Not seen (Variable1[WiMAX FDD TFTP: Seen (Table)] == 0) 1x in 1 sample
[edit] [del] Host CPU usage > x% <equip1> <var1> > <input1>% No --- --- (Variable1[SNMP: CPU usage (Table)] > INPUT1) 1x in 1 sample
[edit] [del] Host disc usage > x% <equip1> <var1> > <input1>% No --- --- (Variable1[SNMP: Disc capacity usage (Table)] > INPUT1) 1x in 1 sample
[edit] [del] Host memory usage > x% <equip1> <var1> > <input1>% No --- --- (Variable1[SNMP: Memory usage (Table)] > INPUT1) 1x in 1 sample
[edit] [del] Host virtual memory usage > x% <equip1> <var1> > <input1>% No --- --- (Variable1[SNMP: Virtual memory usage (Table)] > INPUT1) 1x in 1 sample
[edit] [del] Interface error > x <equip1> <var1> No --- --- (Variable1[SNMP: Error measurement (Table)].Input value > INPUT1

Figure 6-1: Threshold Template Configuration - Template List

2 Do one of the following:

» Click **[add new]**. The Threshold Configuration editor displays an empty template table.

» Click **[edit]**. The Threshold Configuration editor displays the template table with information.

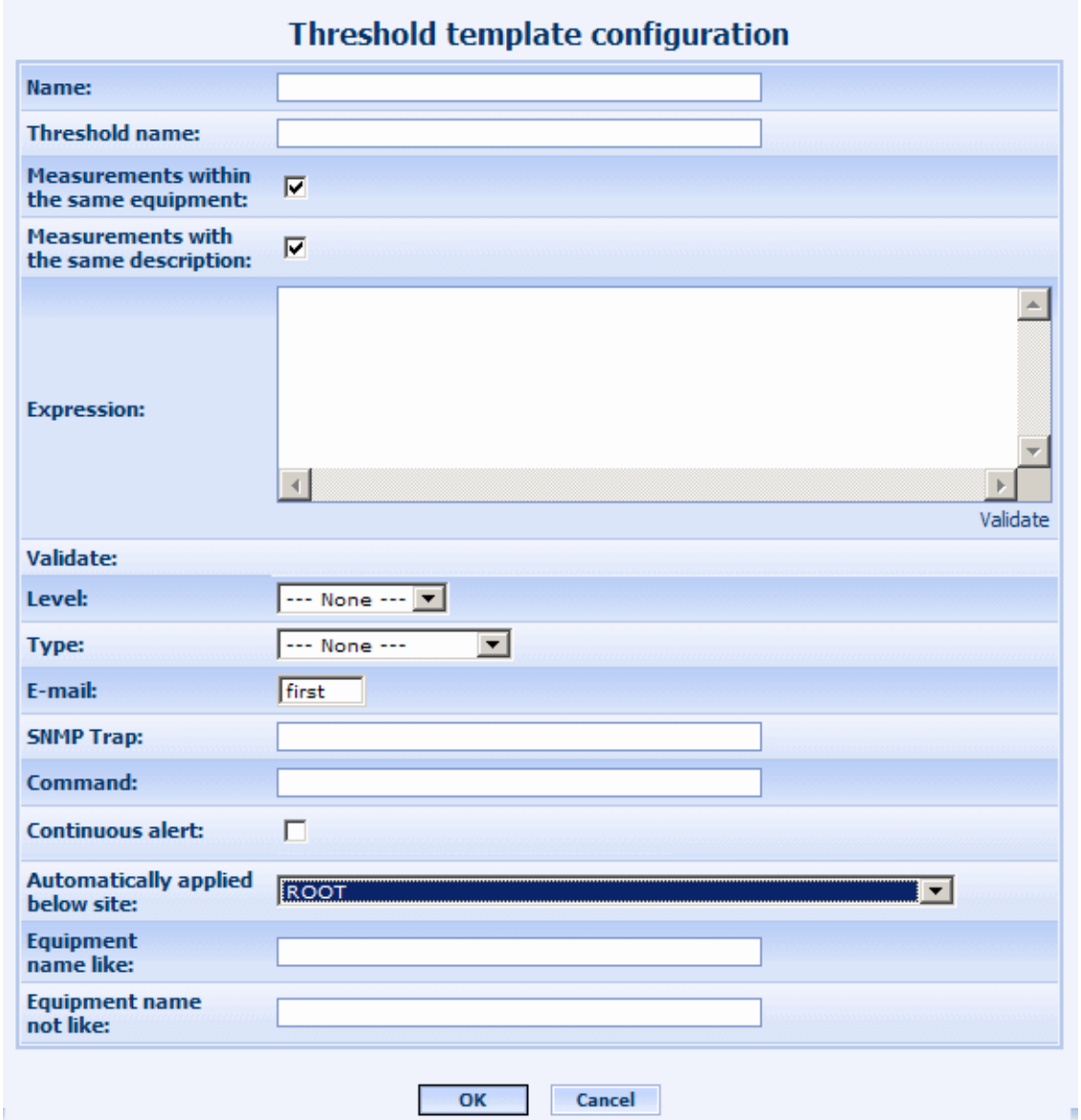


Figure 6-2: Threshold Template Configuration - New

3 Fill in the fields with the following information:

- **Name**: Template name: For example: "FDD SNMP OCCUPATION too low"
- **Threshold name:** A unique and meaningful name that contains the names of the individual thresholds that will be created. At least one of the following notations should be added:
  - <equip[number]>: the name of the equipment of the measurement that corresponds to the variable with the given number
  - <var[number]>: the name of the measurement that corresponds to the variable with the given number

Table 6-1: Threshold Name Examples

Threshold Name In Template	Actual Threshold Names
<var1> CPE drop <equip1>	BS 0.0.131.8.131.1 Active MS Qty CPE drop Browns Hill
	BS 0.0.131.8.144.3 Active MS Qty CPE drop Audet
<equip1> too many HO <var1>	Audet too many HO BS 0.0.131.8.144.1 Successful Ho Attempts
	Sainte-Francoise too many HO BS 0.0.131.8.79.2 Successful HO Attempts

- **Measurements within the same equipment**: Always select this option (for system internal use)
- **Measurements with the same description**: Always select this option (for system internal use)
- **Expression:** The threshold format. See Step 3 below.
- **Validate**: Checks that the expression is valid (see Step 3 and 4 below)
- **Level:** The possible threshold values in decreasing severity levels:
  - Critical (red background)
  - Major (orange background)
  - Warning (yellow background)
  - Minor (cyan background)
- **Type:** Not applicable.
- **E-mail:** The e-mail address(es) to which the application should send a message if there is threshold violation. Select one or more e-mail addresses by highlighting (and using the CTRL and Shift keys) the required address(es) from the predefined list (refer to "Setting E-mail Addresses (Admin only)" on page 251). Do deselect an address, press CTRL and click the entry.

A prerequisite for the actual e-mail notifications is activating the SMTP server (see "Northbound Interface (NBI)" on page 268)

- **SNMP Trap:** The list of addresses where the system should send SNMP traps in case of threshold violation. The addresses should be separated by commas. There are two basic options for address:

  1. IP address only - The trap is sent with the default credentials of 'public' community and port 162.
  2. According to the following format:

     ```
     [community@]computer_name or ip[:port]
     ```

- **Command:** Not applicable
- **Continuous alert:** If selected, at each violation the appropriate e-mail and/or SNMP trap is sent. If not selected, this will be done only if there was no violation during the previous measurement. In both cases, the system will send an e-mail and/or SNMP clearing event when the threshold violation is ended.
- **When:** Which time period template is used for the threshold. The possible options are set in Settings > Templates > Exclusion Window Templates.
- **Automatically applied below site**: Specify the site under which the threshold template will be applied whenever NEs are introduced into this site. Recommended: "ROOT". (See also "Automatic Assignment of Threshold Templates" on page 182). When you specify a site, two additional field are displayed:
  - Equipment name like: Enter a string for the system to search and filter. The found equipment will be assigned the threshold template.
  - Equipment name not like: Enter a string for the system to search and filter out. The found equipment will not be assigned the threshold template.

    If you do not specify the filtering parameters above (recommended), the threshold template parameters are used for every threshold created based on this template.

3. Specify the threshold attributes in the **Expression section:**

   The threshold syntax contains 4 parts, separated by a [#] key. That is: <value(VARx)> <comparators (=><)> <reference value> <frequency>. You can also have relations between expressions: Or/ And.

   Examples:

   - Expression 1

     ```
     #VAR1.O#4029 > 5000.0#1#1#
     ```

     or

```
#VAR2.O#4030 > 5000.0#1#1#
```

Verified Expression

```
(Variable1[WiMAX 4Motion: Successful Ho Attempts (Table)] > 5000.0)
   1x in 1 sample
```

or

```
(Variable2[WiMAX 4Motion: Failed Ho Attempts (Table)] > 5000.0) 1x in
   1 sample
```

» Expression 2

```
#VAR1.O#4AST.OUT < 50.0#3#3#
```

or

```
#VAR2.O#4AST.IN < 50.0#3#3#
```

Verified Expression

```
(Variable1[WiMAX 4Motion: Average Sector Throughput (Table)].Downlink
   < 50.0) 3x in 3 sample
```

or

```
(Variable2[WiMAX 4Motion: Average Sector Throughput (Table)].Uplink <
   50.0) 3x in 3 sample
```

» Trendline Expression

```
#TREND_LINE_DIFF:2:0:VAR1.O#4021 <= -5#1#1#
```

Verified expression:

```
(Variable1[WiMAX 4Motion: Active MS Qty (Table)] Trend Difference <=
   -5) 1x in 1 sample
```

For lists of syntax elements for thresholds, refer to Chapter 11.

Usually only the following part of the Perl syntax is necessary:

- and: and expression
- or: or expression
- +, -, *, /: mathematical operations
- (,): punctuation
- !: logical negation
- <, <=, ==, >=, >: value comparators

StarQuality supports multiple variables and logical operators as shown below:

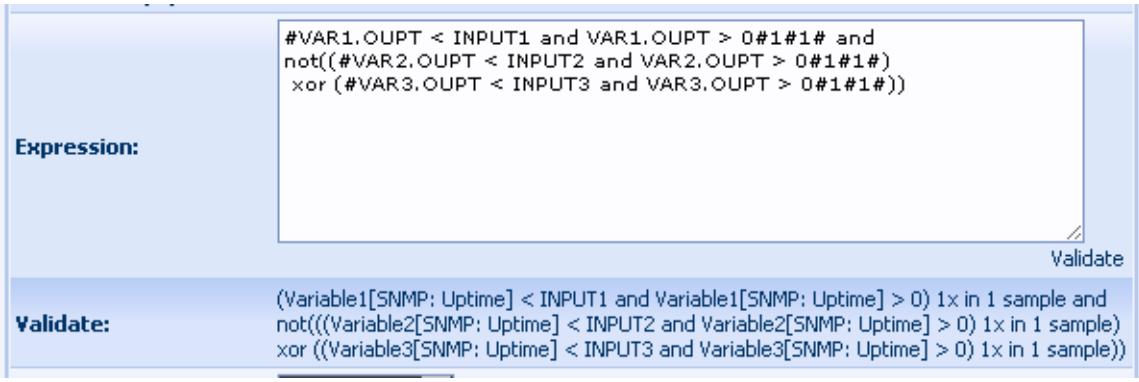


Figure 6-3: Expression Containing Multiple Variables

When using multiple variables, their names should be differentiated: var1, var2, etc. Also, all the variables must belong to the same equipment.

Alternatively you can create the template without expression and later edit the threshold locally using input field. See detailed information in "Generating the Expression Using Input Fields" on page 191.

4 Click **Validate**. If the syntax is red, fix it according to the above. Note that if the validation does not succeed, the system does not pinpoint the exact source of the problem.

5 Click **OK**; A new threshold template is added to the system.

INFORMATION

If you set the threshold template for automatic activation, an additional management button **[now]** is displayed for its entry. Refer to "Automatic Assignment of Threshold Templates" on page 182.

6.3 Automatic Assignment of Threshold Templates

As mentioned before, a threshold template can be configured for automatic assignment for newly discovered NEs (either CPEs or BTSs). The new NE introduced into the network will be assigned the automatically activated threshold template.

If the "Automatically applied below site" option is defined when creating or editing the threshold template, the mechanism is activated.

To activate automatic template assignment:

There are two ways of operation:

- Automatic mode - Once every 4 hours (first time is 4 hours after the threshold template saving), the system searches for NEs matching the threshold template which do not implement it. If any such NEs are found, the template is applied to them.
- Manual mode - Click **[now]** next to the threshold entry to trigger the same search for NEs as described above. See also "Assigning Threshold Templates to Equipments" on page 185.

6.4 Importing and Exporting Threshold Templates

You can export threshold templates as *.xml* files and import reports to/from another StarQuality system or for backup.

The following fields of the threshold template are imported/exported depending on their setting in the source and destination systems:

- *When*: since this is a pointer to an exclusion window template (time frames in which thresholds can be activated/deactivated), StarQuality will abort the import if the selected exclusion window name of the template in the source system does not exist in the destination system.
- *Type*: if the type name selected for the template in the source system does not exist in the destination system, StarQuality only displays a warning message and the field remains empty.
- *E-mail*: StarQuality only assigns the e-mail address for the template if the e-mail address from the source system exists among the e-mail addresses configured by the importer and the user had not configured this e-mail twice.

To export a threshold template(s):

1 From the Settings menu select Templates > Threshold template export. The Threshold Template Export window is displayed.

Figure 6-4: Threshold Template Export

2 Select the template(s) to export by selecting the check-boxes next to the names. To export all the templates, select the Name check-box.

3 Click **Export**. The File Download prompt is displayed.

4 Select if to save or open the reports as *xml* files.

To import a threshold template(s):

1 From the Settings menu select Templates > Threshold template import. The Threshold Template Import window is displayed.

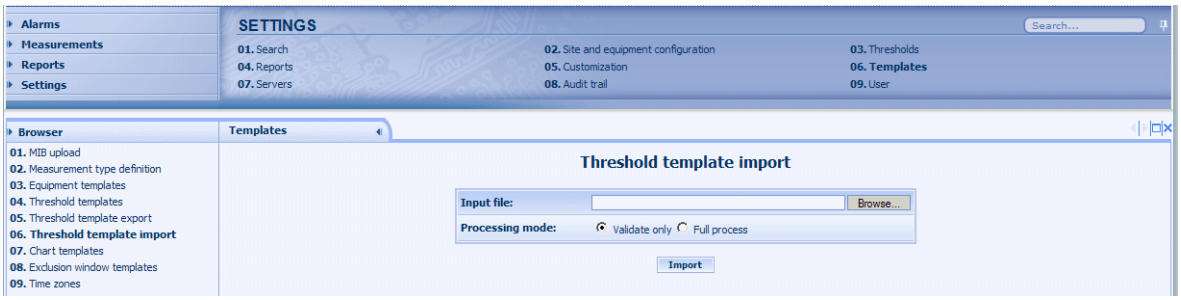


Figure 6-5: Threshold Template Import

2 Click **Browse** to find the report(s) to import.

3 Select one of the following options:

- **Validate only** - Return to the original values after the operation. The report is not imported.
- **Full process** - Apply all the changes after the import.

4 Click **Import**. The threshold template is added to the templates list.

6.5 Assigning Threshold Templates to Equipments

To assign a threshold template to multiple equipments:

1 From Settings select Threshold > Configuration. The threshold list is displayed.

2 Do one of the following;

» Click **[now]** next to the threshold entry. The system searches for NEs matching the threshold template which do not implement it. If any such NEs are found, the template is applied to them.

» Click **[from template]**, and proceed with the next steps.

3 Choose a threshold template from the drop-down list. The Threshold Configuration editor displays the attributes of the template.

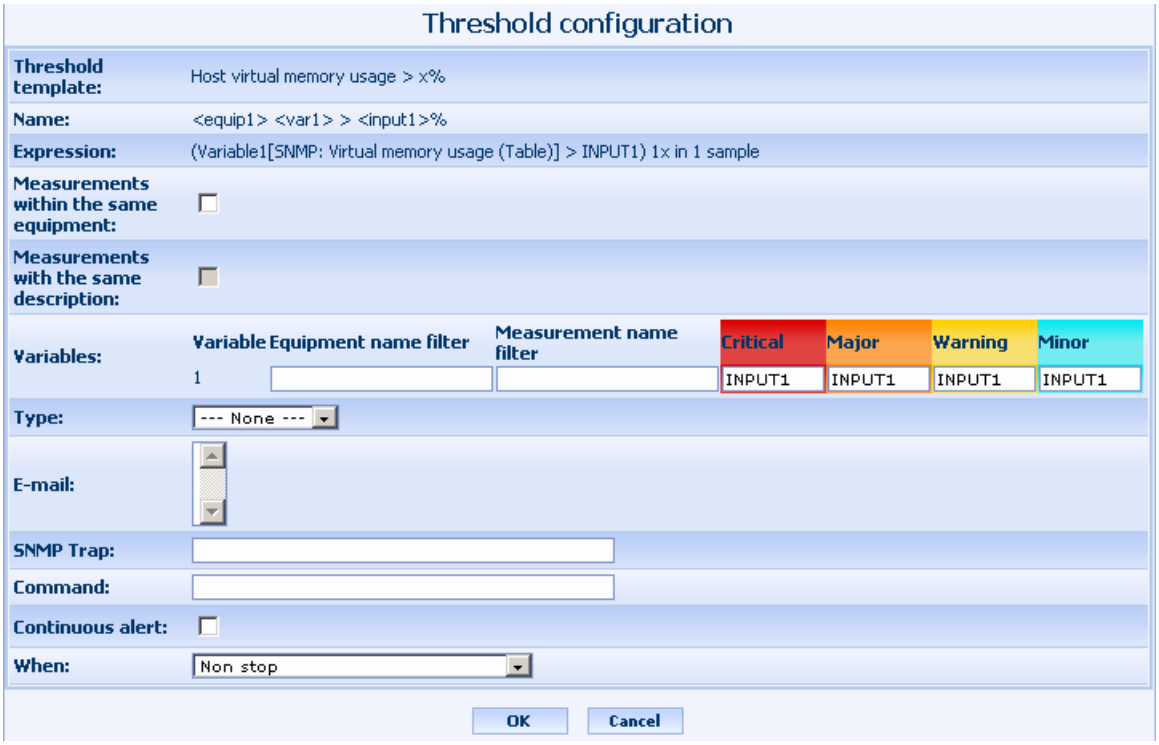


Figure 6-6: Using Threshold Template

4 If required, edit the values in the template. If the threshold contains references to multiple variables, check the **Measurements within the same equipment** and the **Measurements with the same description** checkboxes.

5 Click **OK** to view the list of relevant equipments for this threshold template. All are checked by default, and you can select the equipment(s).

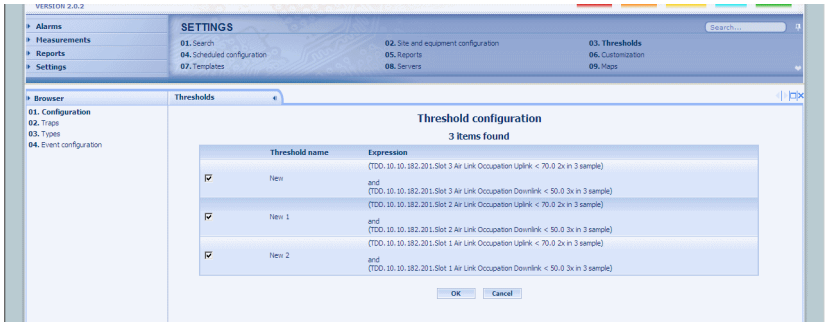


Figure 6-7: Relevant Equipments

6 Click **OK**; The system creates the selected thresholds.

To assign a threshold from template to a specific BTS:

1 Access the Site and Equipment Configuration in one of the following methods:

- From Measurements, select the equipment and from the Operations pull-down menu select Go To Configuration.
- From Settings select Site and Equipment Configuration.

2 Scroll down to the Threshold section and click **[From Template]**, or choose New Threshold from Template from the operations drop down menu.

3 Select a template from the list to assign to the threshold and click **OK**; the system displays the threshold template details. You can modify the attributes as required.

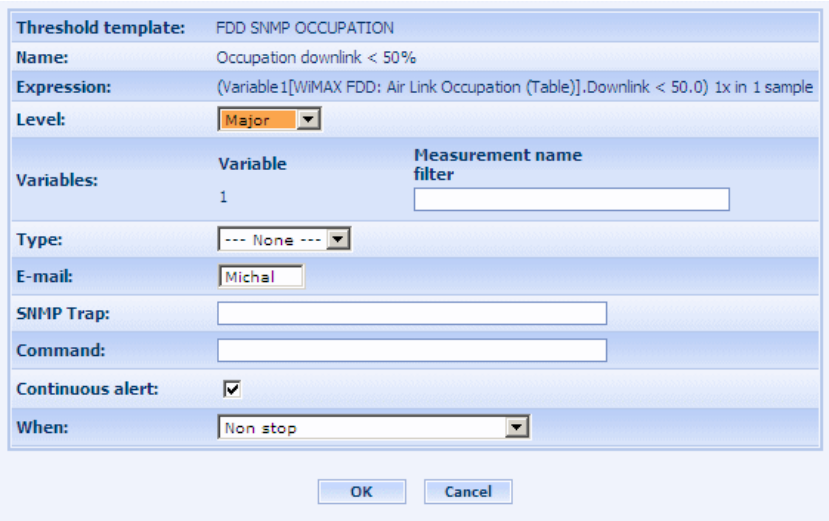


Figure 6-8: Threshold Template Details

4 Click **OK**; The system finds items (AUs or SUs) belonging to this BTS to which to assign the template.

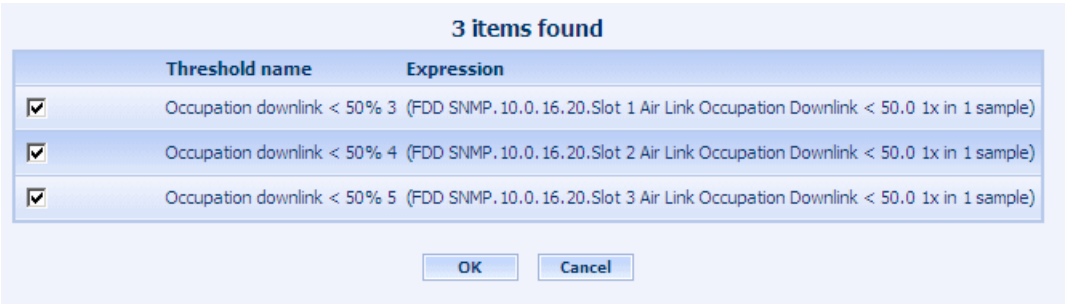

3 items found
Threshold name
Expression
Occupation downlink < 50% 3 (FDD SNMP.10.0.16.20.Slot 1 Air Link Occupation Downlink < 50.0 1x in 1 sample)
Occupation downlink < 50% 4 (FDD SNMP.10.0.16.20.Slot 2 Air Link Occupation Downlink < 50.0 1x in 1 sample)
Occupation downlink < 50% 5 (FDD SNMP.10.0.16.20.Slot 3 Air Link Occupation Downlink < 50.0 1x in 1 sample)
OK
Cancel

Figure 6-9: Items to Assign The Threshold

5 Select the AUs/SUs to assign the threshold to and click **OK**. The threshold is added to the list of thresholds for the equipment.

6.6 Editing Thresholds

6.6.1 Editing an Existing Threshold Template

When you edit an existing template on which active thresholds are based, all these thresholds are automatically affected. The system identifies and lists these potentially affected thresholds for approval.

To edit a threshold template:

1 Do one of the following:

- From Settings select Templates > Threshold Templates. The Threshold Template Configuration list is displayed.
- From Settings select Site and equipment configuration. Navigate to the equipment holding the threshold to be edited. Scroll down to the thresholds list.

2 Click **[edit]** next to the threshold template to be modified.

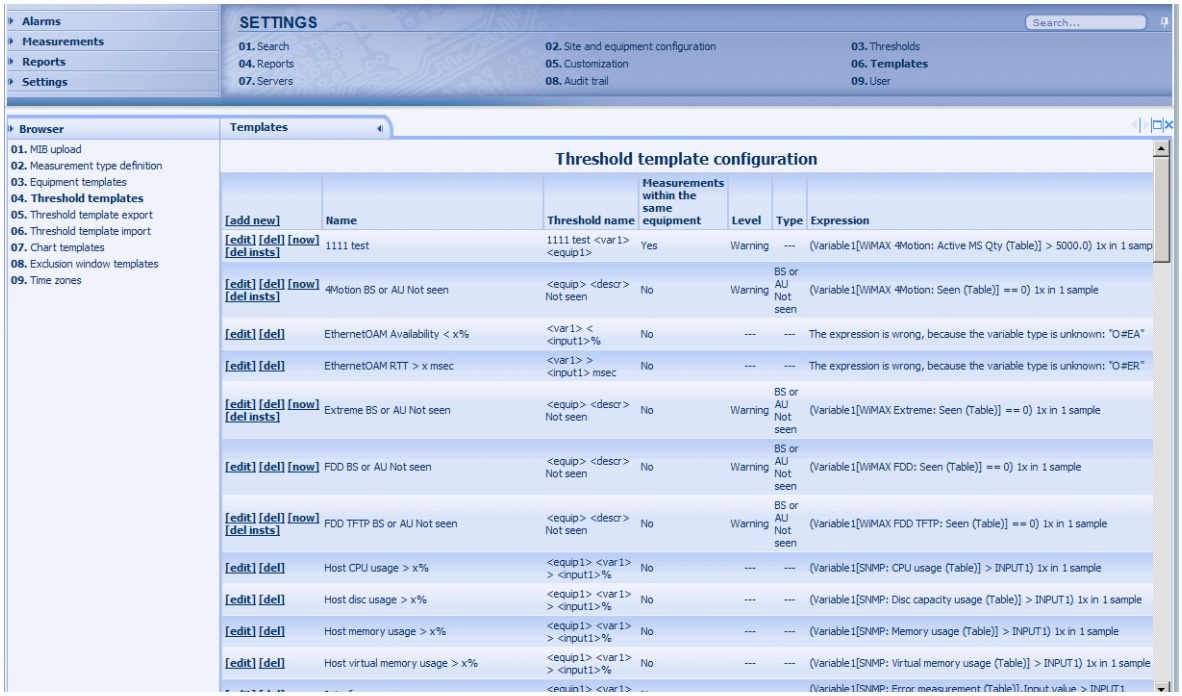


Figure 6-10: Threshold Template Configuration - Template List

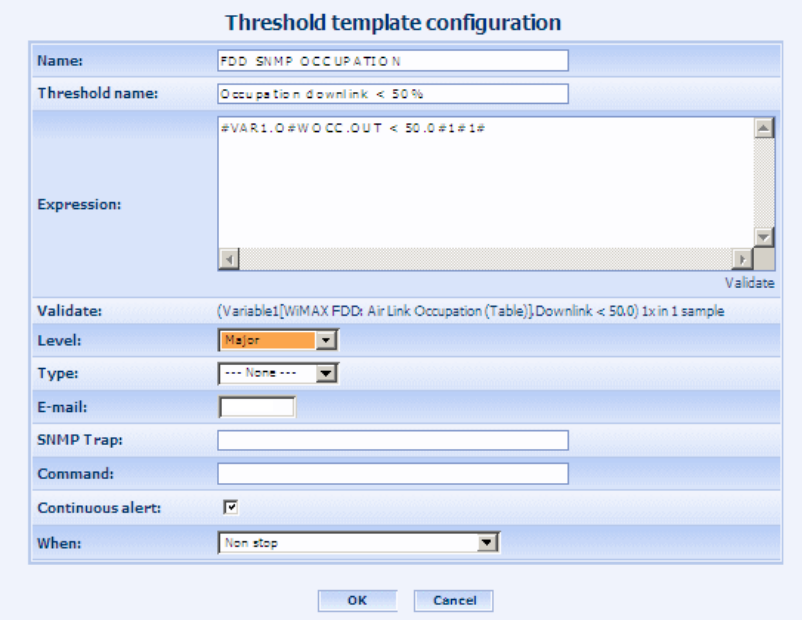


Figure 6-11: Threshold Template Configuration - Editing

3 Modify the required threshold attributes (see detailed information in "" on page 176).

4 Click **OK** to save your modification to the template.

If no thresholds are based on this template, the modifications are saved and the list of threshold templates reappears.

If there are thresholds based on this template, the Threshold Configuration editor displays the modified attributes and lists these potentially affected thresholds for approval (Figure 6-12).

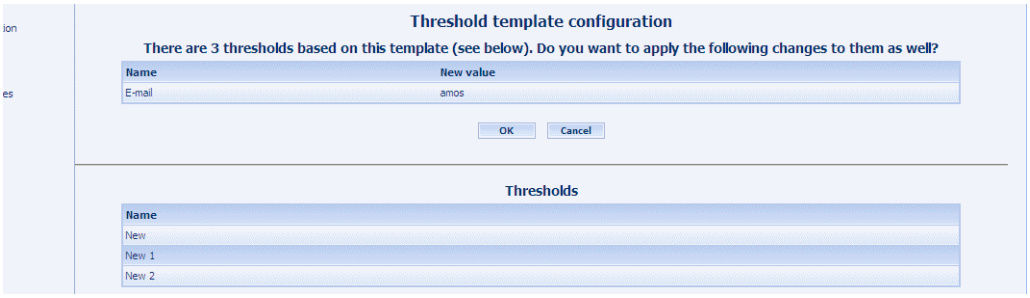


Figure 6-12: Message on Template-based Threshold Modification

The settings made here will override any local change in each of these thresholds. To avoid loosing such local changes, you may consider modifying the template and not the threshold itself.

Clock **OK** to save the modification; the list of threshold templates reappears.

6.6.2 Editing a Template-based Threshold (Local Change)

Editing the threshold template itself will override any local change in thresholds. To avoid loosing such local changes, you may consider modifying the template and not the threshold itself.

To edit a template-based threshold:

1. From Settings select Threshold > Configuration. The Threshold list is displayed.
2. Select a specific threshold and click **[edit]**; the following message appears:

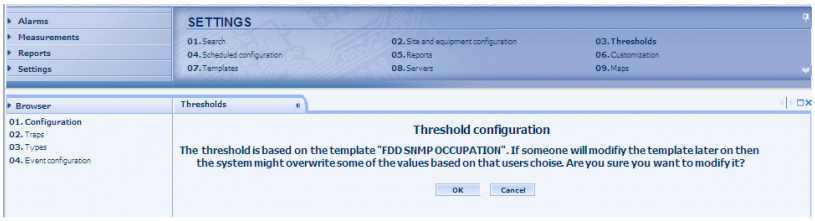


Figure 6-13: Message on Template-based Threshold Modification

3. Click **OK**; the Template Configuration window is displayed.
4. Modify the required threshold attributes. You can use the input fields as described in "Generating the Expression Using Input Fields" on page 191.
5. Click **OK** to save your modification to the threshold.

6.7 Generating the Expression Using Input Fields

This section provides basic rules for creating threshold expressions using input fields. Input files are not available when creating or editing threshold templates.

You can use the input fields in the Threshold Configuration window (Figure 6-14) available in the following cases:

- Creating or editing a threshold that is not template-based
- Locally modifying a template-based threshold (see "Editing a Template-based Threshold (Local Change)" on page 190)

To generate a threshold expression:

1 Access the Threshold Configuration window (Settings > Thresholds > Configuration.

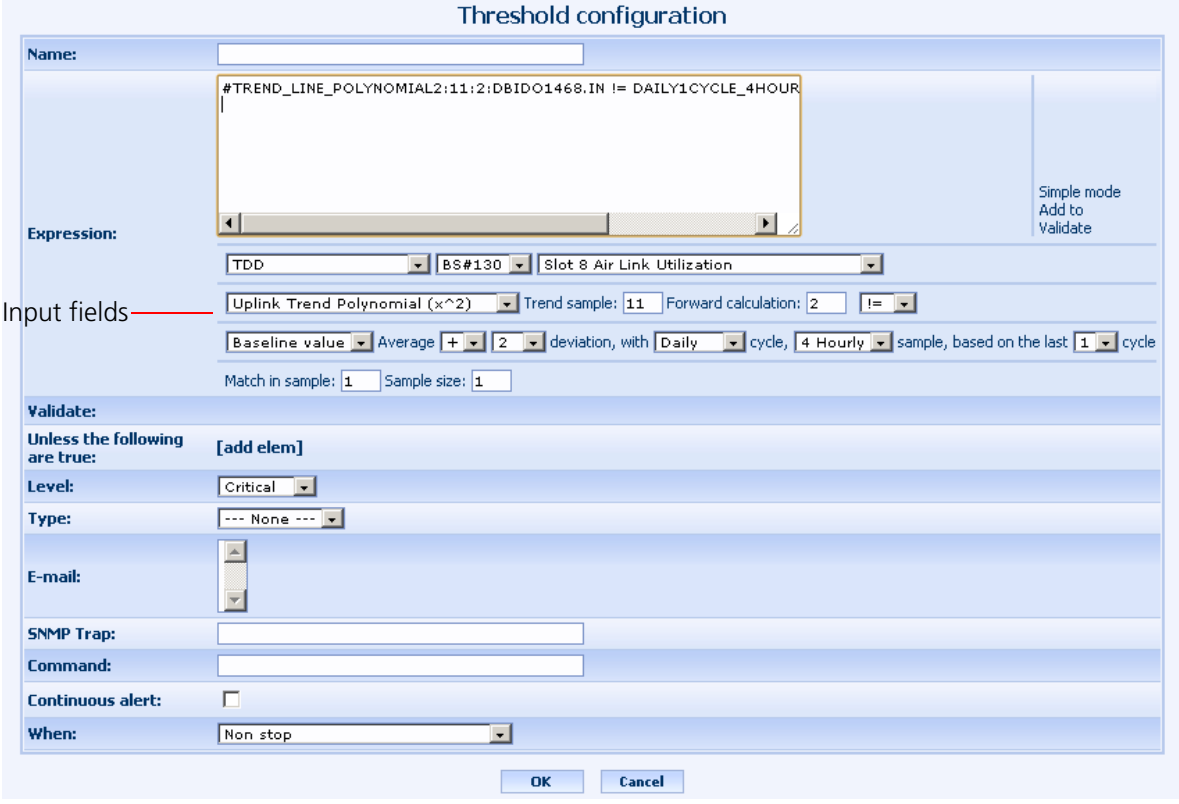


Figure 6-14: Threshold Configuration

2 In the Threshold Configuration page fill in or select the following fields as required. The available parameters may differ depending on the equipment type and measurements:

- The site and equipment of the measurement drop-down fields are displayed only when opening the threshold editor from the main page. If you edit the thresholds from the Equipment page, you can choose the measurements belonging only to that specific one.
- The measurement to be selected. This may be an actual value or a trendline value (linear, polynomial, difference etc.).
- Operator:
  - A relational operator within the expression like: ==, !=, <, <=, >, >=.
  - A condition like Successful or Unsuccessful. In this case the second operand in the expression is irrelevant.
- Compare value - This is the second operand of the relational expression (relevant only if a relational operation is used):
  - **Static value**: interpreted with the same measurement unit as the one displayed on the measurement chart. If there is a single measurement in the sub-expression, the application draws a horizontal line on the measurement chart at the compare value.
  - **Baseline value**: the average of the measured values calculated with the specified cycle and resolution + or – a multiple of the standard deviation
- Frequency
- In how many samples
- Based on the last x cycles
- Match in sample
- Sample size

3 Click the **[Add to]** link; The application inserts the required element at the current cursor position in the text, which can be of one of the following two types depending on the values of the fields:

- If the compare value is filled, the application inserts a complete sub-expression element, namely:

```
#selected_measurement_code operator compare_value#frequency#in how many#
```

- If the compare value is not filled, the application inserts only the code of the selected measurement.

4 Anytime during the editing process you can click on the **[Validate link]** to check whether the expression has the required syntax. If the syntax is invalid, an error message is displayed, and if it is valid, the user readable format of the expression is displayed in the validate field.

Usually only the following part of the Perl syntax is necessary:

- and: and expression
- or: or expression
- +, -, *, /: mathematical operations
- (,): punctuation
- !: logical negation
- <, <=, ==, >=, >: value comparators

The lists of Thresholds syntax elements are described in "Device Specific Information" on page 273.

Chapter 7 - Threshold-Crossing Alarms Monitoring

In this chapter:

- "Overview" on page 195
- "Navigating, Viewing and Filtering Alarms" on page 197
- "Downloading Data to Excel Files" on page 202

7.1 Overview

Viewing Alarms is performed similarly to viewing measurements: a configurable quick menu at the top panel is used for displaying and navigation, and also new elements can be added to it using the Settings > Customization menu.

The alarms are displayed on the most prominent parts of the user interface to provide quick accessibility. The color-coded summary of the currently active alarms are displayed at the top-right corner of the window. The alarms can be navigated by selecting the Alarms item on the main menu.

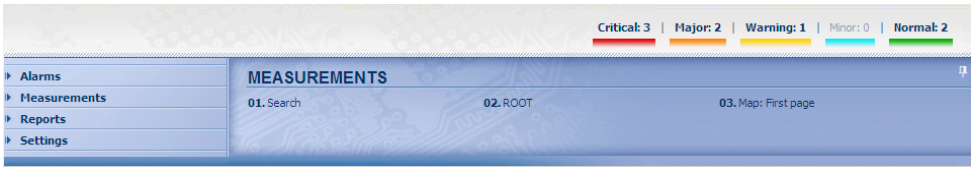


Figure 7-1: Alarms Summary at the Top Right Corner of the Window

By default, only the "Root" highest level group is listed.

The list view of alarms is displayed in the following figure:

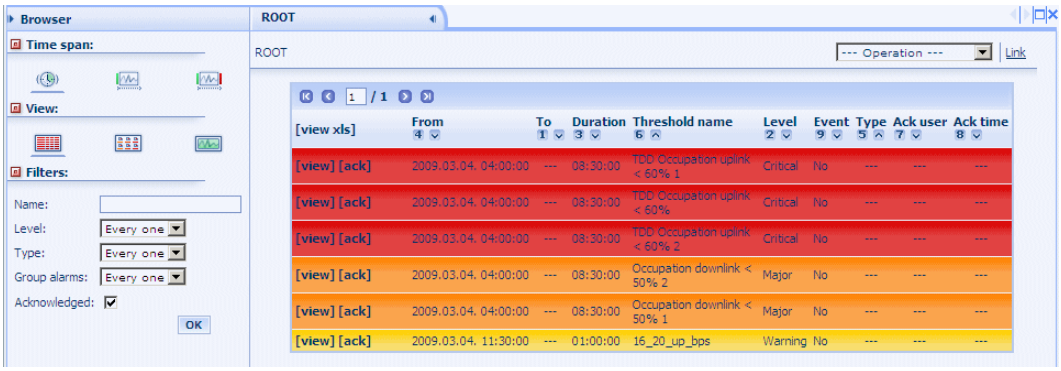


Figure 7-2: Table View of Alarms

To use the Alarms list:

Use the following operations in the alarms list:

Table 7-1: Using the Alarms List

To	Do this	Comments
Move to next page/entries on the list	Use the arrows (< >) at the top of the list	

Table 7-1: Using the Alarms List (Continued)

To	Do this	Comments
Sort the list by column entries	Click on the column header	
Sort in ascending/descending order	Click the up/down arrows under the column header	The numbers indicate the order
Download the table	Click the **[view xls]** link	
Obtain detailed information of an entry	Click the **[view]** link	the corresponding measurement values are displayed in a chart.
Acknowledge an alarm	Click the **[ack]** link	if the alarm has already been acknowledged, the time and name of the user that acknowledged are displayed in the table.
Delete (close) an alarm	Click the **[ack]** link (if available)	If the alarm is not a threshold violation but is from an event definition, and the event has not yet been closed, a [del] link appears.

Deleting an alarm is necessary, for example, if there is no closing event in the definition or a trap has been lost, or if the alarm is not relevant anymore. In this case, if the alarm has not been acknowledged yet, then it becomes acknowledged as well.

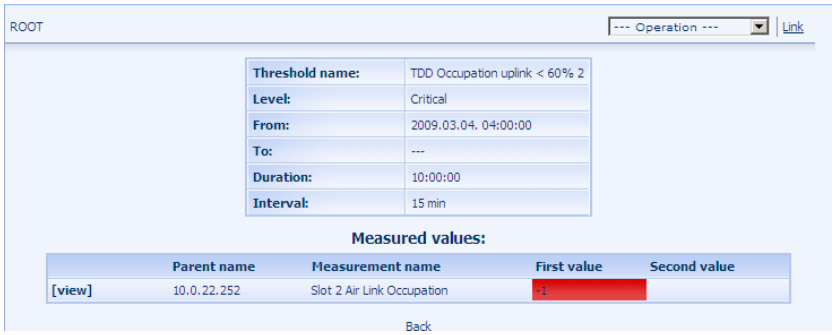


Figure 7-3: Detailed Alarm Information

7.2 Navigating, Viewing and Filtering Alarms

The browser**,** at the left-hand side of the user interface under the main menu, is used to filter and arrange the alarms. There are three *groups* in the Browser, each controls the display of alarms. The individual groups can be expanded or collapsed and by clicking on the button on the left edge next to them, which can be useful since this panel has no scroll bar. A *tooltip* is also displayed if the mouse pointer is moved above the group icon.

Filtering of alarms can only be set with these groups if a set of alarms is already selected on the top part of the screen.

The following sections explain in details the individual groups.

7.2.1 Viewing Alarms by Time Span

You can define the time span of alarms to be displayed. The following view options are available in this group:

Table 7-2: Time Span Options

Icon	Tooltip	Description
	Realtime view	The currently active alarms are displayed
	Historical view by date	A calendar is displayed. Select the desired day, week, month, and year to display alarms during that time
	Historical view by time	Specify the time interval (hours, seconds, etc.)

7.2.2 Alarm Display Options

The way the alarms are displayed can be changed using the second group of controls.

7.2.2.1 Main View Options

The following view options are available in this group:

Table 7-3: Alarms View Options

Icon	Tooltip	Description
	Table view	The alarms are displayed in a list table. This is the default view. Refer to "Overview" on page 195, and Figure 7-2.

Table 7-3: Alarms View Options (Continued)

Icon	Tooltip	Description
	Object view	The current site hierarchy is displayed with icons instead of the table of alarms. The color of icon indicates the most severe alarm existing for this item. See detailed description of this view below ("Object View Options" on page 198).
	Chart view	The number of active alarms are displayed in a graphical form (see "Chart View" on page 200).

7.2.2.2 Object View Options

By selecting the "Object view" icon, the current site/virtual site hierarchy is displayed with icons instead of the table of alarms. Only those sites for which there is an active alarm are visible. The icons are colored by the color code of the most severe alarm of the contained equipment: for example, if under a site there is an equipment with am active "Critical" alarm, the color of the site's icon is red; if the most severe active alarm of the equipment under the given site is "Major", then its color is orange, and so forth.

During navigation the navigation path is displayed in the top line above the middle viewing area (under the name of the tab), which can be used to quickly navigate up to higher levels by clicking on its segments.

In the "Object view", three further icons are available, which are used to further simplify the object view:

- **Icon view**: The sites containing alarms are displayed with large, easy-to-see icons, up to five in a row.

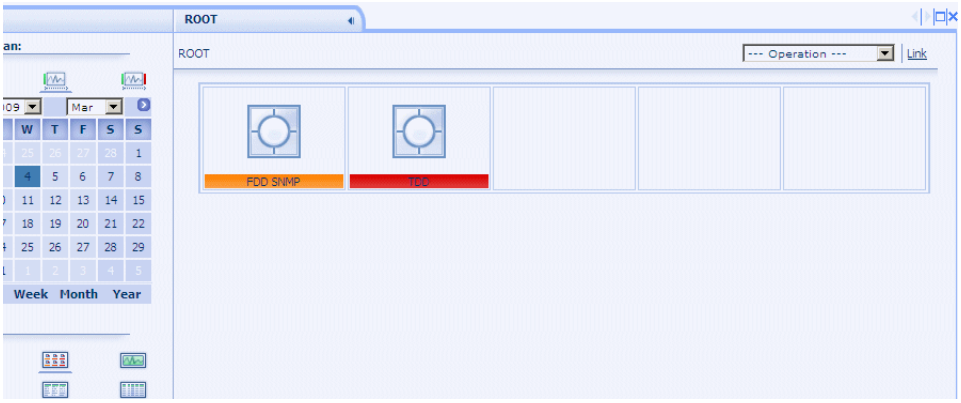


Figure 7-4: Icon View of Alarms

- **List view:** The sites containing alarms are displayed with smaller icons (up to five in a row) allowing more icons to be displayed on a single screen. Icons with alarms can easily be identified based and their color codes.

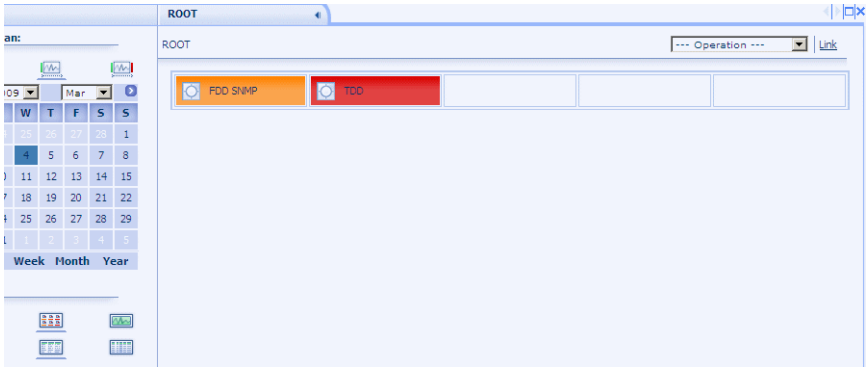


Figure 7-5: List View of Alarms

- **Detailed view:** The site/equipment icons are listed one under another (still colored) together with their names and descriptions

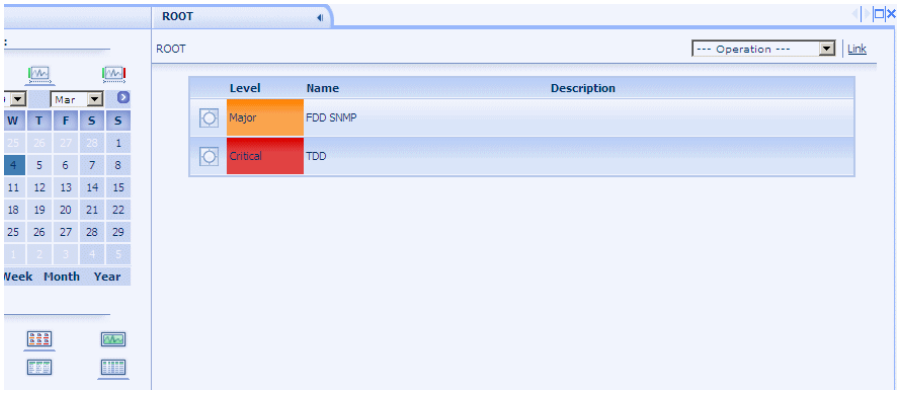


Figure 7-6: Detailed View of Alarms

In each of these views, navigate to a site by clicking on its icon.The contained sites and equipment are displayed in a similar view.

Tracking the hierarchy downwards you can reach the equipment causing the alarm, and then by clicking on the icon of this equipment the name of the violated threshold and the chart of the referenced measurement values are displayed. On this lowest level you can also choose a threshold that is currently not violated in order to check the settings of the threshold value.

If the alarm is not threshold but event based, StarQuality displays the time of alarm on the chart with superimposed transparent red rectangles.

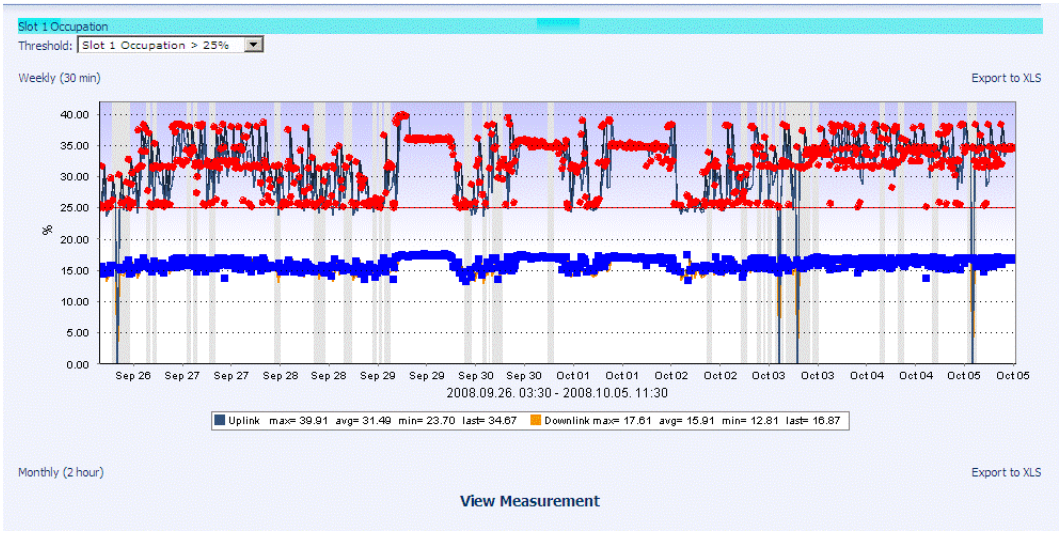

Slot 1 Occupation
Threshold: Slot 1 Occupation > 25%
Weekly (30 min)
Export to XLS
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
%
Sep 26 Sep 27 Sep 27 Sep 28 Sep 28 Sep 29 Sep 29 Sep 30 Sep 30 Oct 01 Oct 01 Oct 02 Oct 02 Oct 03 Oct 03 Oct 04 Oct 04 Oct 05 Oct 05
2008.09.26. 03:30 - 2008.10.05. 11:30
Uplink max= 39.91 avg= 31.49 min= 23.70 last= 34.67
Downlink max= 17.61 avg= 15.91 min= 12.81 last= 16.87
Monthly (2 hour)
Export to XLS
View Measurement

Figure 7-7: The Equipment Level View of Alarms

7.2.2.3 Chart View

This view can only be selected for historical time intervals that do not contain the current time (that is, if the current time interval is *not* the real-time/Auto refresh view).

7.2.3 Filtering Alarms

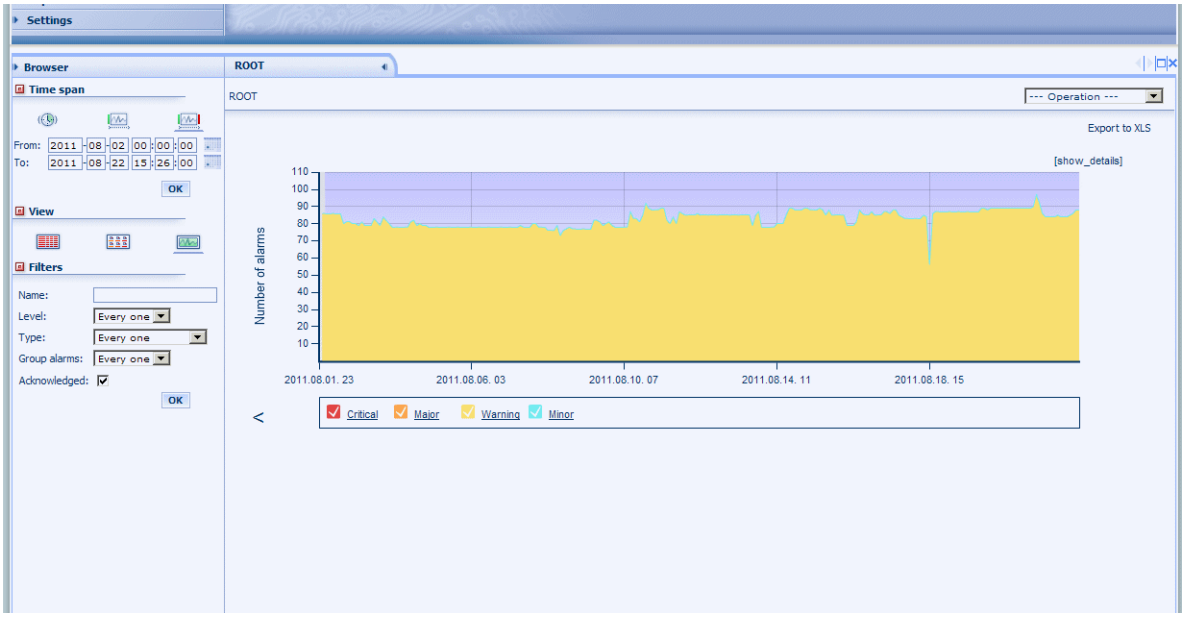


Figure 7-8: Chart View of Alarms

In the alarms browser, the third group "Filters" allows the specification of filter-conditions of alarms. Filtering is available using the following types:

Table 7-4: Filtering Types

Type	Description
Name	The name of the threshold (which typically contains the name of the corresponding equipment, such as "E1909 low availability"). The % and _ characters can be used here. Most useful in the List view.
Level	A drop-down list, used to filter on the severity level: Critical, Major, Warning, Minor).
Type	A drop-down list, used to filter on the threshold type.
Grouped	A drop-down list, used to set whether the normal and/or the grouped alarms should be displayed.
Acknowledged	Display acknowledged alarms - Yes/No

7.3 Downloading Data to Excel Files

You can download the displayed data in XLS format. The generated XLS file containing the measurement data also includes the name of the threshold, and the background color of the data cells that violate the threshold matches the color code of its severity level. If threshold violation occurred, but that value was not taken into account in the current alarm, then the background color of the cell is set to cyan.

If a public or private (as opposed to normal) chart is exported to an XLS file, the generated file differs in the following aspects:

- The number of columns and their names are the same as in the chart definition
- Regardless of the chart definition the values are not aggregated
- The resolution of rows follows the smallest time interval of the measurement data, thus infrequent measurement data are stored sparsely in the table

To save data to Excel:

- To save the alarms table click **[view xls]**; open or save the file.

	A	B	C	D	E	F	G
1	**Created by:**	**Administrator**		**When:**	**2009.03.04. 14:31:45**		
2	**From date:**	**2009.03.04. 14:31:31**		**To date:**	**2009.03.04. 14:31:31**		
3							
4	**From date**	**To date**	**Duration**	**Threshold name**	**Level**	**Ack user**	**Ack time**
5	2009.03.04. 04:00:00		10:15:00	Occupation downlink < 50% 1	Major		
6	2009.03.04. 04:00:00		10:15:00	Occupation downlink < 50% 2	Major		
7	2009.03.04. 11:30:00		02:45:00	16_20_up_bps	Warning		
8							
9							

Figure 7-9: Sample XLS of Alarm Table

- To save the chart data, click **[Export to XLS]** above the chart. The first few lines of a sample exported XLS file are:

	A	B	C	D	E	F	G
1	**Parent name:**	10.0.16.20		**Parent description:**			
2	**Measurement typ**	Air Link Occupation		**Measurement na**	Slot 1 Air Link Occupation		
3	**From date:**	2009.03.04. 11:45		**To date:**	2009.03.04. 12:45		
4	**Created by:**	Administrator		**When:**	2009.03.04. 14:07:29		
5	**Unit:**	%		**Remark:**			
6	**Interval:**	15 min		**Threshold name**	Occupation downlink - Level	Major	
7							
8	**Time**	**First value**	**Second value**				
9	2009.03.04. 11:45:00	39.7	17.8				
10	2009.03.04. 12:00:00	39.7	24.6				
11	2009.03.04. 12:15:00	39.4	45.6				
12	2009.03.04. 12:30:00	38.6	50.2				
13	2009.03.04. 12:45:00	38.6	50.1				
14							

Figure 7-10: Sample XLS File of Chart Data

Chapter 8 - Reports

In this chapter:

- "Overview" on page 205
- "Report Configuration" on page 206
- "Importing and Exporting Report Definitions" on page 217
- "Scheduling Report Delivery" on page 219
- "Viewing Reports" on page 221
- "Exporting Data from the StarQuality Database" on page 224

8.1 Overview

StarQuality enables generating reports for analyzing the collected data on a chosen set of sampled objects (AUs, SUs, measurements) in the system. Administrator users can configure selected subsets, variables and reports views.

Each report can be generated using one of the following methods:

- Pre-defined and configurable reports, summarizing measurements per day/week/month. When installed, the system already contains the same set of four reports for most device types:
  - BottomN Uptime
  - TopN Air Link Utilization (not applicable to BreezeACCESS VL and Extreme)
  - TopN Sector Throughput
  - TopN Number of Connected SUs (not applicable to 4Motion)

  For details on device specific pre-defined reports, refer to Chapter 11.
- Bulk export wizard reports - the wizard is embedded in the client and generates reports for a limited amount of database data (up to 65000 entries), by cross selection of chosen NEs and date range. The report outputs in xls format
- Oracle data API (Application Program Interface), for bulk export of large amounts of data by selection of chosen NEs date range and KPIs.
- On-demand reports - Creation and generation of reports referring to data already existing in the database. Refer to “Working with On-Demand Reports“ on page 213

8.2 Report Configuration

The configuration of reports (Settings > Reports), is available to admin users only.

The following configuration options are available:

- Report variables: Defining the variables used for reports
- Report views: Creating reports by selecting variables
- Report definitions export: Saving reports as *xml* files.
- Report definitions import: Introducing xml files into the reports database
- Scheduled reports: Setting a schedule for report delivery

Report generation consists of the following steps:

- Defining the variables, which are the building blocks of the reports. Only measurements performed after defining them as variables will be available for the reports. Refer to Section 8.2.1.
- Sorting the created variables in various combinations into report views. Refer to Section 8.2.2.

8.2.1 Defining Report Variables

Reports are based on the system existing measurements.

To start defining report variables:

1 From the Settings menu select Reports > Report Variables. The Report Variable Configuration starting page contains a table showing the active (currently monitored) and inactive report variables. In a new system, the table contains the variables used for the predefined reports.

Alarms
Measurements
Reports
Settings
SETTINGS
Search...
01. Search
02. Site and equipment configuration
03. Thresholds
04. Reports
05. Customization
06. Templates
07. Servers
08. Audit trail
09. User
Browser
Reports
01. Report variables
02. Report views
03. Report export
04. Report import
05. Scheduled reports
06. Scheduled equipment send
Report variable configuration
[add new] Variable name Measurement name Additional query Detailed summary at equipment level Interval When Active
[edit] 4Motion Air Link Utilization ALL Air Link Utilization ALL --- Yes 900 Non stop Yes
[edit] 4Motion Average Sector Throughput Average Sector Throughput --- Yes 900 Non stop Yes
[edit] 4Motion DL Air Link Utilization, Data Zone DL Air Link Utilization, Data Zone --- Yes 900 Non stop Yes
[edit] 4Motion DL Air Link Utilization, First Zone DL Air Link Utilization, First Zone --- Yes 900 Non stop Yes
[edit] 4Motion Number Of Connected SUs Number Of Connected SUs --- Yes 900 Non stop Yes
[edit] 4Motion UL Air Link Utilization, Data Zone UL Air Link Utilization, Data Zone --- Yes 900 Non stop Yes
[edit] 4Motion Uptime Uptime E.NAME NOT LIKE 'SU __-__-__-__-__' No 900 Non stop Yes

Figure 8-1: Report Variables Window (Example)

To create a report variable:

1 Click **[add new]**. The following window is displayed:

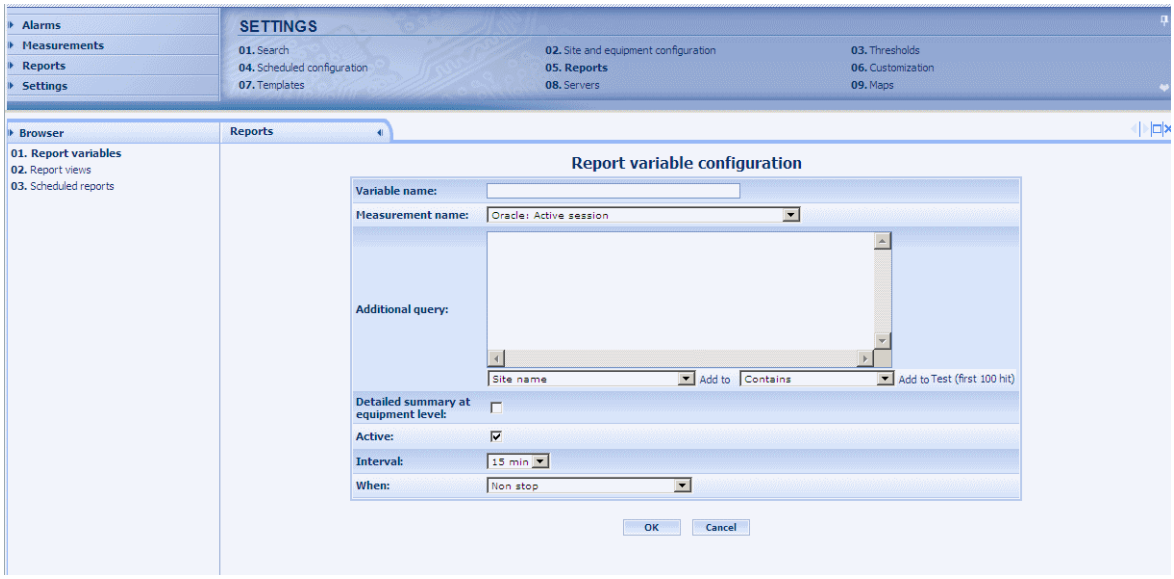


Figure 8-2: Adding a New Report Variable

2 Enter a unique and meaningful name for the variable. The name should reflect the device type as well as the measurement. For example: "TDD Utilization".

3 Select a Measurement Name from the drop-down list. The list is based on measurements per collector/equipment type. Make sure to select the measurement from the correct collector.

4 Leave Detailed summary at equipment level unchecked.

5 Verify that the Active check-box is selected.

6 Leave the interval of 15min.

7 In the When field, select the required timeframe for collection from the drop-down menu or leave the value as "non stop".

8 Click **OK**. The report variable is added to the list.

To edit an existing report variable:

1 Click **[edit]** next to the variable to be changed. The Report Variable Configuration window is displayed (see Figure 8-2).

2 Edit the variable name as required.

3 Select if to activate the variable calculation using the Active check-box.

4 Click **OK**; the report variable is updated in the list.

INFORMATION

- An active report variable consumes computer resources. Therefore, it is recommended to define only the required variables and deactivate redundant ones.
- The only way to disable a variable is to set it as inactive. You cannot delete a report variable.

8.2.2 Defining Report Views

Report view is the display method of the report variables. You can define three types of table views:

- View 1 - Each table contains one KPI per one NE (network element), in the form of the built-in default reports
- View 2 - Each table contains multiple KPIs per CPE
- View 3 - Each table contains multiple KPIs per BS

This section describes how to build the report tables for each of the above types.

To start Report View configuration:

From the Settings menu select Reports > Report Views. The Report View Configuration starting page contains a table showing the active report views. On a new system, this table contains the predefined reports.

Alarms
Measurements
Reports
Settings
SETTINGS
01. Search
02. Site and equipment configuration
03. Thresholds
04. Reports
05. Customization
06. Templates
07. Servers
08. Audit trail
09. User
Search...
Browser
01. Report variables
02. Report views
03. Report export
04. Report import
05. Scheduled reports
06. Scheduled equipment send
Reports
Report view configuration
[add new] [copy from]
Name
Type
Top level
First hierarchy level
Result window
[edit] [del] [tables] 4Motion BottomN Uptime TopN Yes Measurements 10
[edit] [del] [tables] 4Motion TopN Air Link Utilization TopN Yes Measurements 10
[edit] [del] [tables] 4Motion TopN Average Sector Throughput TopN Yes Measurements 10
[edit] [del] [tables] 4Motion TopN Number Of Connected SUs TopN Yes Measurements 10
[edit] [del] [tables] Extreme BottomN Uptime TopN Yes Measurements 10
[edit] [del] [tables] Extreme TopN Number Of Connected SUs TopN Yes Measurements 10
[edit] [del] [tables] Extreme TopN Throughput TopN Yes Measurements 10
[edit] [del] [tables] FDD BottomN Uptime TopN Yes Measurements 10
[edit] [del] [tables] FDD TFTP BottomN Uptime TopN Yes Measurements 10
[edit] [del] [tables] FDD TFTP TopN Air Link Occupation TopN Yes Measurements 10
[edit] [del] [tables] FDD TFTP TopN Air Link Utilization TopN Yes Measurements 10
[edit] [del] [tables] FDD TFTP TopN Number Of Connected SUs TopN Yes Measurements 10
[edit] [del] [tables] FDD TFTP TopN Throughput TopN Yes Measurements 10
[edit] [del] [tables] FDD TopN Air Link Occupation TopN Yes Measurements 10
[edit] [del] [tables] FDD TopN Air Link Utilization TopN Yes Measurements 10
[edit] [del] [tables] FDD TopN Number Of Connected SUs TopN Yes Measurements 10
[edit] [del] [tables] FDD TopN Throughput TopN Yes Measurements 10

Figure 8-3: Report View Configuration Window (example)

To create a new report view:

1 Click **[add new]**. The Report view configuration window is displayed.

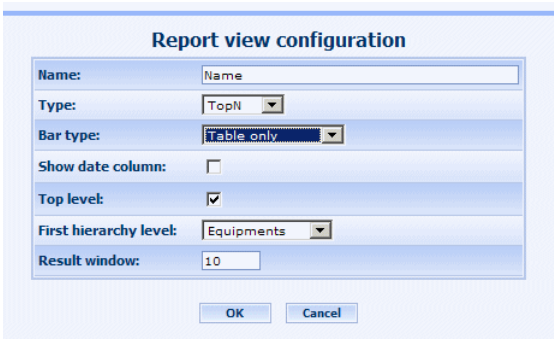


Figure 8-4: Creating a New Report View

2 Set the following properties: Enter a meaningful name (free text).

3 Select type: TopN.

4 Select the Bar Type: Table only (other options are not applicable)

5 Select if to add a column with dates.

6 Leave the Top Level check-box selected.

7 Set the First Hierarchy Level as follows:

- For View 1 - Measurements
- View 2 - Equipment
- View 3 - Measurements

8 Set the number of result entries per window.

9 Click **OK**. The new view is added to the list of views.

10 In the Report View Configuration window (see Figure 8-3) locate your newly added view name and click on the **[tables]** link next to it. The configuration page is displayed:

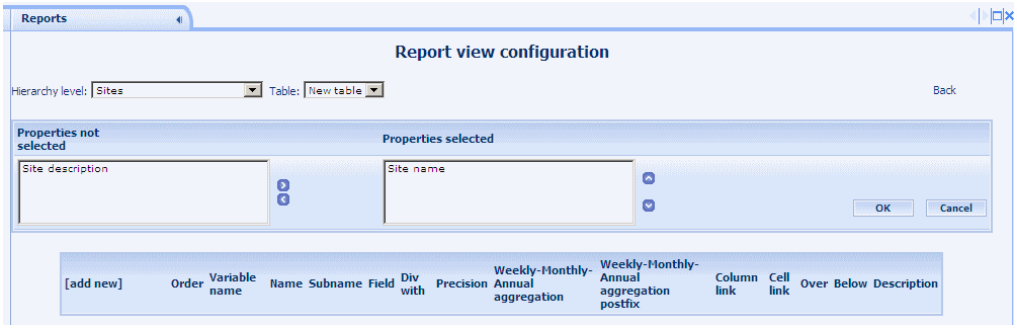


Figure 8-5: Configuration Page

11 For views 1 and 3 only - In the Hierarchy level select: Additional Measurements.

12 For view 2 - for view 2 - Choose properties: Equipment name for SU name, Site name for BSID, and equipment IP address for BTS identifier.

13 For view 3 only - Move the Measurement Name property to the Properties not selected column. For BTS identification choose Equipment name and/or equipment IP address.

14 Click **[add new]** to add variables to the report view. Add as many variables as necessary. The following window is displayed per each variable:

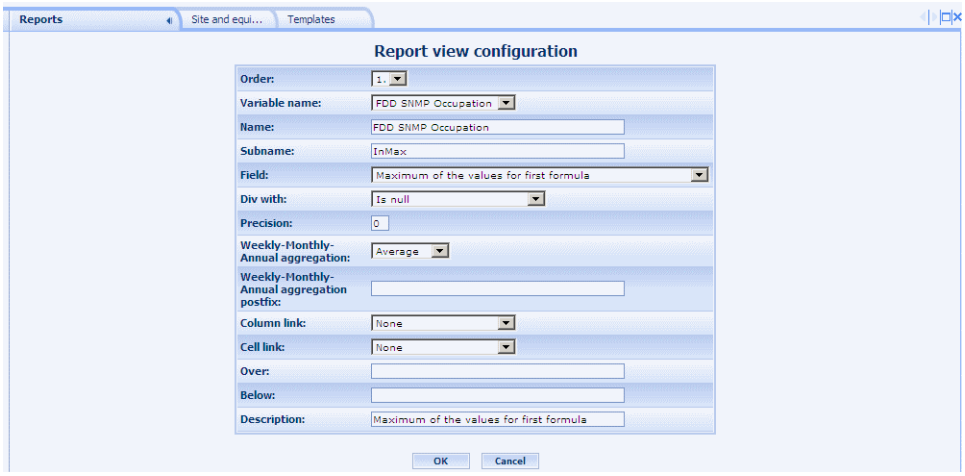


Figure 8-6: Adding a New Variable

15 Repeat for each variable:

a Set the order. Assign the same order to variables you want to group. Grouped variables share variable-.name and name; they differ by subname.

b Select a variable name from the drop-down list of your pre-defined variables (See "To create a report variable:" on page 207.)

c Enter a meaningful name for the order group.

INFORMATION

If applicable, the name should specify if the measurement is an uplink or downlink value.

d Enter a meaningful subname for the sub-column; it is only visible on the report, if there are at least two grouped columns.

Example of grouping according to steps a - d:

- Common Measurement name: Utilization
- Common Name: Utilization Downlink
- Subname: Min. for one variable, Max. for the other

e From the Field drop-down list select the required field value. Make sure that the field matches the names given above.

INFORMATION

If applicable, 'First formula' always represents uplink; 'Second formula' represents downlink.

f Leave Div with 'is null'. Leave the Precision value at 0.

g Set Weekly-monthly aggregation according to the value selected in the Field.

h Enter the Weekly-monthly-yearly summary postfix: The application appends this text to the name of the column if the field is specified and it is not a daily report.

i Leave all the next fields unedited.

j Click **OK**. The Report View Configuration page is displayed.

16 In the upper right side of the page, select the report order using the Order by Column drop-down list.

17 Click **Back** in the upper right corner to save changes and return to the report view list.

18 To view the report, see "Viewing Reports" on page 221.

To edit an existing report view:

1 From Settings select Reports > Report Views.

2 Click **[tables]** next to the report view you want to edit.

3 In the upper section, select the hierarchy level: Additional Measurements.

4 Click **[add new]**, **[edit]** or **[delete]**.

To create a new report view based on an existing view:

1 Click **[copy from]**; a setting page is displayed. (see Figure 8-7).

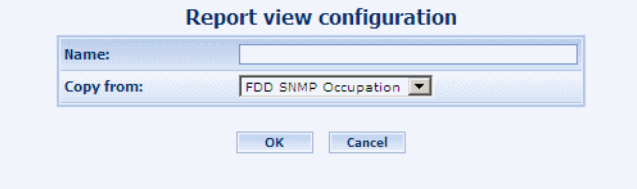


Figure 8-7: Creating a New Report View Using the Copy From Option

2 Enter a new name for the report view.

3 Select the report name to base the new report view from the drop-down list.

4 Click **OK**.

5 Edit the new report as described above.

8.2.3 Working with On-Demand Reports

By using the On-demand reports, the system creates and generates reports referring to data already existing in the database. It is recommended to specify limited amount of data for the report, as processing large amounts of data may cause system overload.

The On-demand reports are generated on 15- minute granulation data samples only (by default 1 month back).

To create an On-Demand report:

1 From the Reports menu, select On Demand Reports. The On-demand selection path and settings window is displayed. The items in the selection path become available as you specify the settings:

Figure 8-8: On-demand Reports - Types

» In the Report Type section, choose either:

◊ By Equipment Level

◊ By Measurement. In this case, select wether to group measurements together.

» When: Which time period is used for the report

2 Click **Search** in the selection path; the Search settings window is displayed:

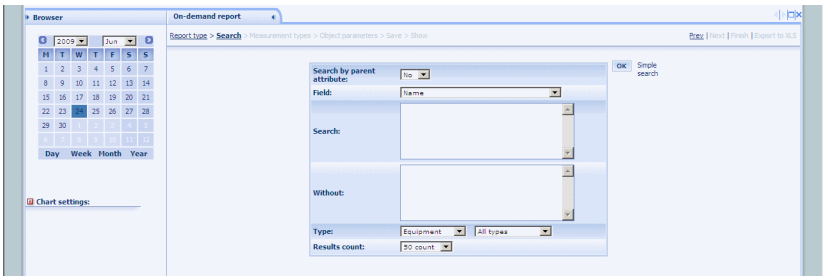


Figure 8-9: On-demand Reports - Search

3 Specify the Search:

- parent attribute:
  - ◊ No - to search by equipment attribute
  - ◊ Yes - to search by parent attribute
- Field: Leave "Name"
- Search - enter strings to be searched. All rules are applied as in "Searching Measurements" on page 167.
- Without - enter strings to exclude from the search.
- Type: Equipments, choose a specific equipment type
- Select the number of requested results in the report.

INFORMATION

The message `Not all matching rows returned!` may appear at the bottom of the table if there are more results than selected counts.

4 Click **OK** at the top-right of the window. The list of results is displayed (Figure 8-10).

5 To narrow or improve the filtering, edit the title line and click **OK**. Repeat until the requested results are returned.

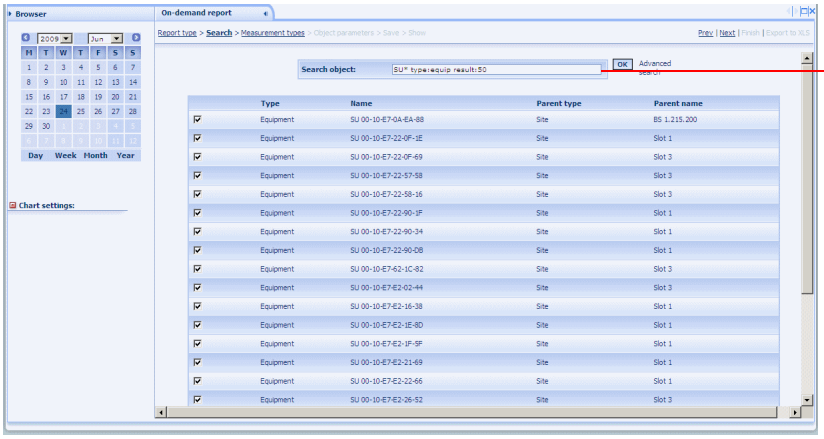


Figure 8-10: On-demand Reports - Measurement Types

6 Click **Measurement Types** in the selection path. A list of available measurement types and calculations is displayed:

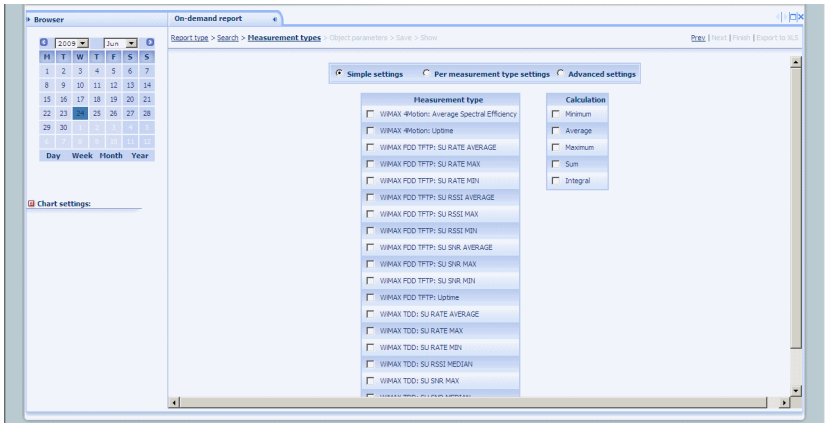


Figure 8-11: On-demand Reports - Measurement Types Settings

7 Select the measurement (s) at the left column, and the calculation (min., max. avg. etc) on the right column.

8 Click **Object Parameters** in the selection path. A list of parameters is displayed. These parameters will be the columns of the report. Some of the parameters are already selected.

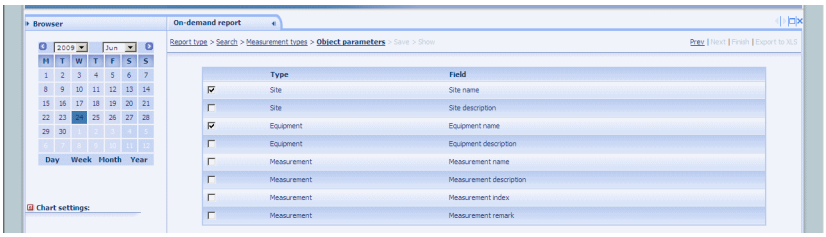


Figure 8-12: On-demand Reports - Object Parameters

9 Select the Measurement name check-box. The Show and Save options are enabled at the selection path.

10 Click **Save** to save the report settings (optional). The following window is displayed. Specify the report name and choose if to include the search settings.

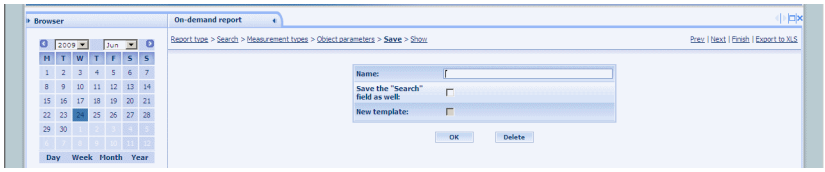

Browser
On-demand report
Report type > Search > Measurement types > Object parameters > Save > Show
Prev | Next | Finish | Export to XLS
Name:
Save the "Search" field as well:
New template:
OK
Delete
Day Week Month Year

Figure 8-13: On-demand Reports - Saving Options

11 Click **Show** to display the report in a regular report format, including the option to specify time frame and export to **xls* format.

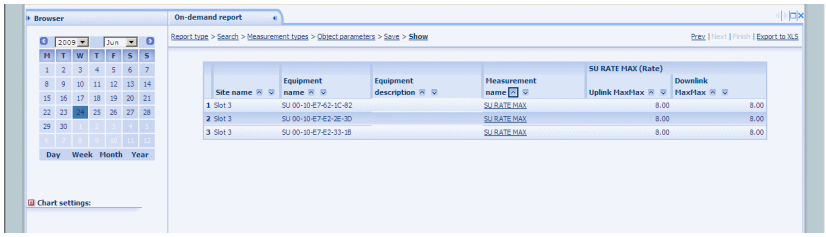


Figure 8-14: On-demand Reports - Show

To delete an On-Demand report:

1 Run the report as described above until one step before saving (steps 1to 9).

2 Instead of choosing "Show", simply delete the measurement name and click **OK**. The report is deleted.

8.3 Importing and Exporting Report Definitions

You can export report definitions as *xml*/files and import/export them to/from another StarQuality system or for backup. StarQuality exports the view definition as you set (see "Defining Report Views" on page 208) and also the required report variable definitions.

To export a report(s):

1 From the Settings menu select Reports > Report export. The Report Export window is displayed.

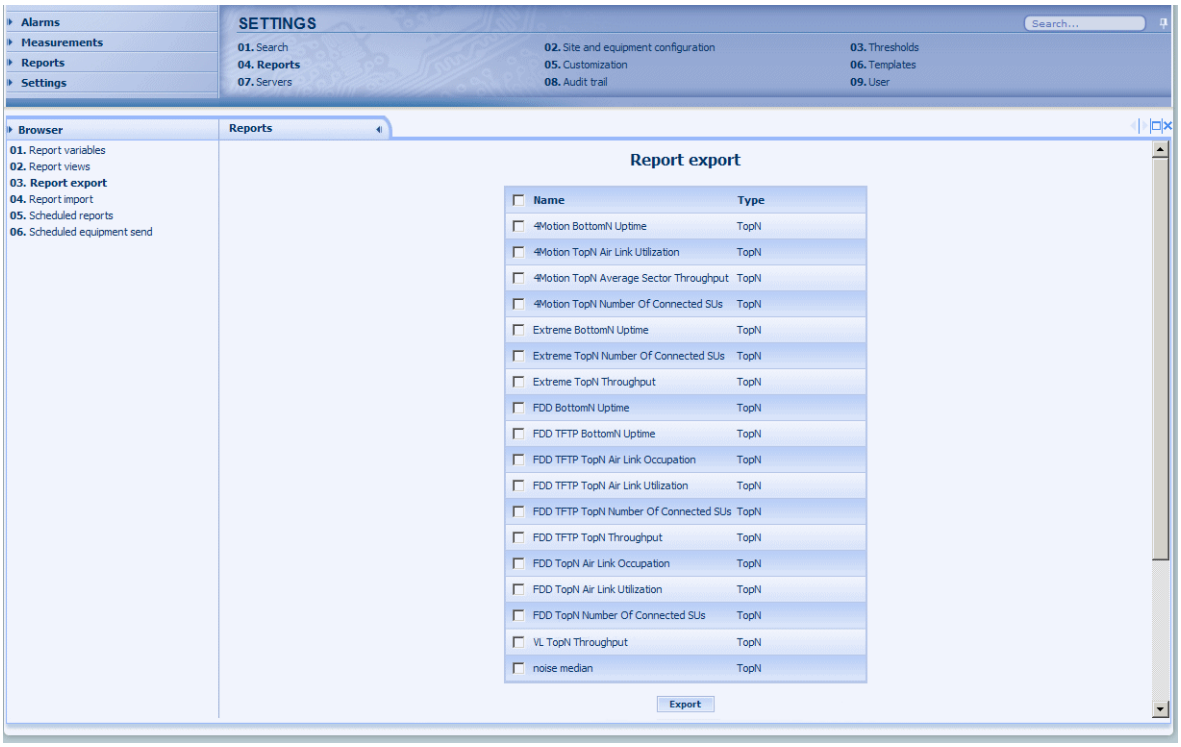


Figure 8-15: Report Export

2 Select the report(s) to export by selecting the check-boxes next to the names. To export all the reports, select the Name check-box.

3 Click **Export**. The File Download prompt is displayed.

4 Select if to save or open the reports as *xml* files.

To import a report(s):

1 From the Settings menu select Reports > Report import. The Report Import window is displayed.

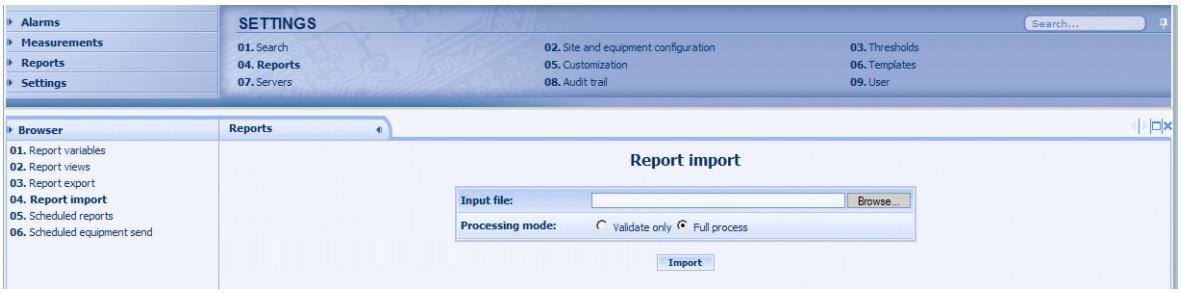


Figure 8-16: Report Import

2 Click **Browse** to find the report(s) to import.

3 Select one of the following options:

- **Validate only** - Return to the original values after the import.
- **Full process** - Apply all the changes after the import.

4 Click **Import**. The report is added to the reports list.

INFORMATION

If a report view or variable already exist in the destination system, StarQuality updates those instances, except the report interval variable.

8.4 Scheduling Report Delivery

You can send reports by e-mail on periodically, using a fixed schedule. This section describes how to configure this schedule.

To schedule a report delivery:

1 From the Settings menu select Reports > Scheduled Report. The Scheduled Report Configuration window is displayed.

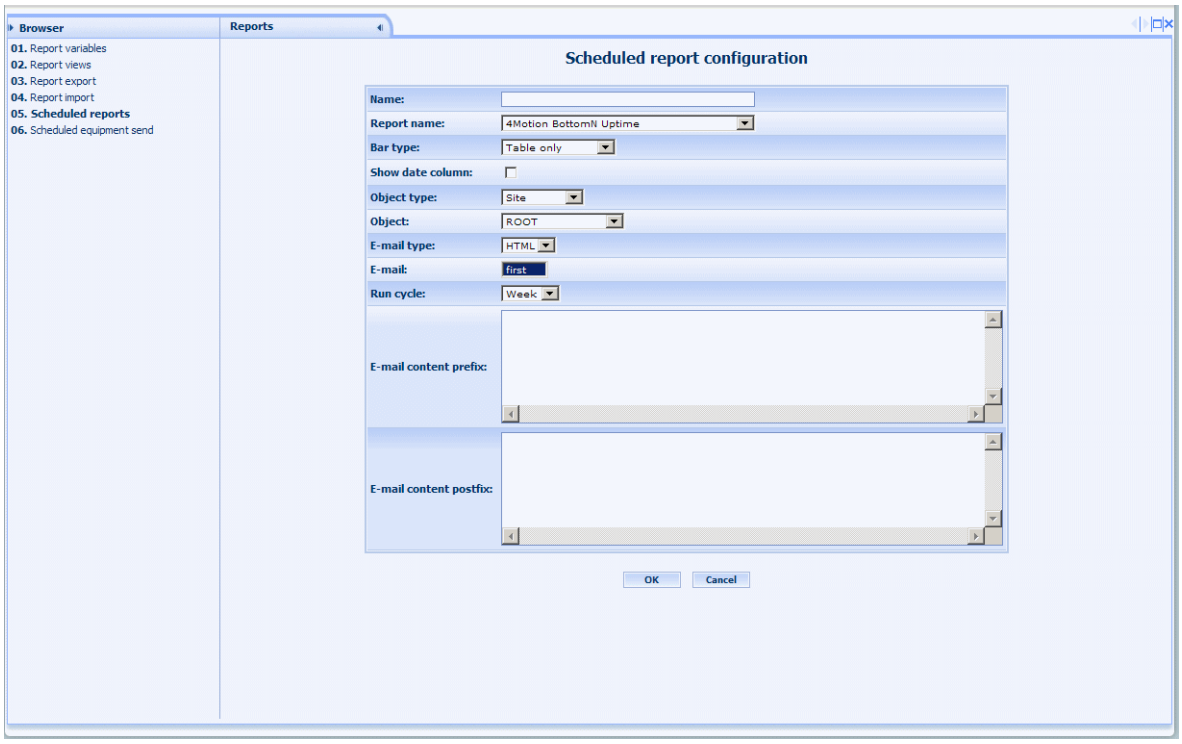


Figure 8-17: Scheduled Report Configuration

2 Enter the following information:

- Name - Free text for the task name
- Report Name - the report to be sent by e-mail
- Bar type - the initial value shown on the Report page for this report view. The valid values are:
  - Table only: No bar presentation
  - Grouped: Sub-columns belonging to the same column are unified
  - Separated: Sub-columns are not unified
  - Order by: Sub-columns are unified, however, the column used for sorting the table remains separated
- Show date column - Display the dates for minimum and maximum values
- Object type - Site or Virtual Site
- Object - Equipment or server
- E-mail type - HTML or XLS format
- E-mail - Text used as the sender name for all outgoing e-mail messages
- Run cycle - The frequency by which to send the report - daily, weekly, monthly
- E-mail content prefix - Free text as the prologue of every e-mail message.
- E-mail content postfix - Free text as the epilogue of every e-mail message.

3 Click **OK**. An e-mail message will be sent to all recipients on a regular basis according to your settings.

8.5 Viewing Reports

Select Reports from the main menu to display available reports. The reports appear about an hour after defining the variables.

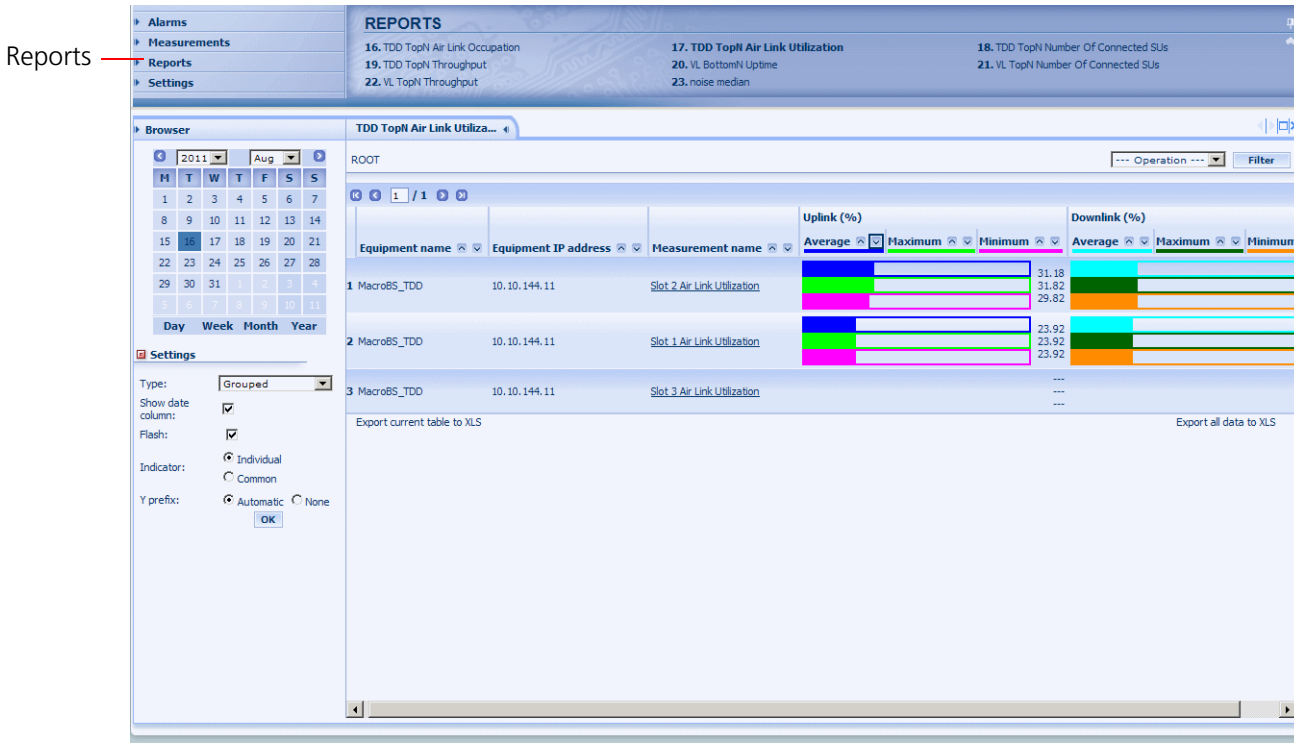


Figure 8-18: Reports Window

8.5.1 Navigating Report Views

Use the following buttons:

Table 8-1: Navigating Reports

Button/Link	Description
	Go to the first and previous page, respectively
	Go to the next and last page, respectively
	Page x out of total number of pages. Jump directly to the required page by entering its number in the text field and pressing the enter key.
	Up and down arrows for ordering all results on the given level. The current ordering is indicated by a blue rectangle around the selected arrow

Table 8-1: Navigating Reports (Continued)

Button/Link	Description
Export current table to XLS	Exports the currently displayed entries to an XLS file.
Export all data to XLS	Exports the all the entries to an XLS file, including entries which are not currently displayed.
Filter	Filters entries by equipment name or measurement name. The rules for special characters are the same as for search (see "Site and Equipment Configuration" on page 233)
Slot 2 Air Link Occupation	Entries with underline, serve as links, and jump to the specific equipment measurement, with the properly selected date and time interval.

8.5.2 Setting the Report Range and Display

While viewing the report results, the calendar at the Browser is used for setting the time interval of the report. The selected report view is displayed to the right of the calendar. You can also set what type of reports to view and whether to display the date in a column.

To use the calendar:

1. Click on the arrow buttons in the two top corners of the calendar to change the month. Alternatively, select a month and year using the drop-down menus (see Figure 8-19).
2. To change the type of time interval, click on the **Day/Week/Month/Year** text links at the bottom.
3. Select the actual time interval by clicking on one of the displayed days, months or years.

INFORMATION

Time intervals starting in the future cannot be selected with the calendar.

Figure 8-19: Calendar views (day, week, month and year) for selecting the time interval

To set report display options:

1. In the Settings area at the bottom of the Browser, select the type of report from the Type drop-down list:
   - » Table only - No bars
   - » Grouped - Sub-columns are unified
   - » Separated - Sub-columns are not unified
   - » Sort by - Sub-columns are unified, however the column used for sorting the table remains separated
2. Select the Show Date in Column option to display (if the report includes dates)

INFORMATION

These settings do not affect the export of reports to *xls* files.

8.6 Exporting Data from the StarQuality Database

There are two bulk export methods available:

- Using the internal Bulk Export Wizard
- Using an external SQL-based API (Application Program Interface)

This section focuses on the internal Bulk Export Wizard. For more information on the API refer to the relevant technical note.

8.6.1 Using the Bulk Export Wizard

The Bulk Export is a wizard driven utility used for exporting data from the StarQuality database into *xls* files according to the following user defined cross sections:

- Timeframe: up to one week
- Network elements:
  - » Type: SU, AU or common BTS data. The number of exported lines is limited to 65,000 per single export. If more lines are required, reduce the number of NEs or narrow the timeframe per export.
  - » Technology: FDD, FDD SNMP, TDD, 4Motion, VL, Extreme

  The system enables choosing specific elements from the list of NEs matching the above conditions. All the KPI relevant the NEs are exported. That is, you cannot select specific KPIs for export.

You can view or save the *xls* file on the client machine at any location.

To export AU or common BTS data:

1 From Reports select Bulk Export Wizard. The Bulk Export Wizard window is displayed.

Figure 8-20: Bulk Export Wizard Window

2 Specify meaningful name and description (free text) to the report.

3 Select a time frame, using the input fields or the calendar button: Specify maximum one week. Longer type results in an error message when trying to proceed to the next stage.

INFORMATION

Seconds are ignored; minutes are regarded as the closest quarter of an hour

4 Select NE Type: BTS and any technology required.

5 Click **BTS Selection** in the path at the top of the work area (see Figure 8-20). The filtering criteria screen is displayed.

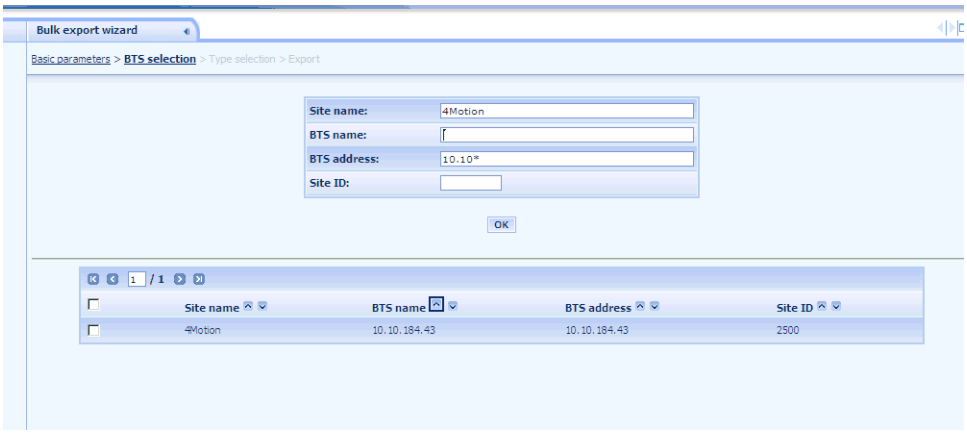


Figure 8-21: Bulk Export Wizard - Filtering Devices

6 Enter the following criteria. (All categories are optional; That is, if left empty, no filtering is performed. Also all input is according to the search rules described in "Searching Measurements" on page 167):

- Site name
- BTS name
- BTS Address (IP)
- Site ID (as exists in the database)

7 Click **OK**. A list of network elements matching the filter criteria is displayed. You can repeat the filtering until getting the desired results.

8 Select the check-boxes of BTSs you wish to export data from, or use the topmost check box to select all the elements.

INFORMATION

The Select All check-box refers only to the currently displayed page. For selecting all the results in all pages, select the check-box separately on each page.

9 Click **Type Selection** in the selection path (Figure 8-20); the Exported Entity choice window is displayed.

» For AU/BS data select Logical BS measurements (default)

» For common BTS data select Common measurements

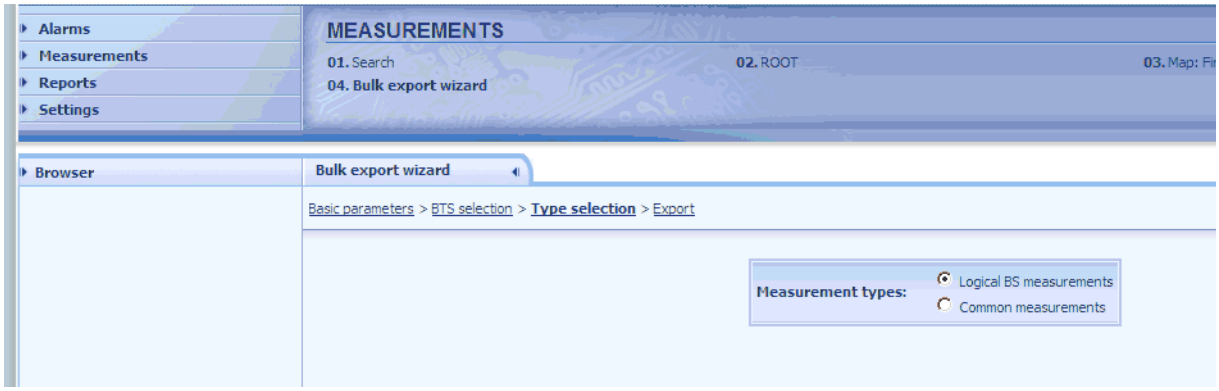


Figure 8-22: Exported Entity Selection

10 Click **Export** in the selection path (Figure 8-20). The following message is displayed:

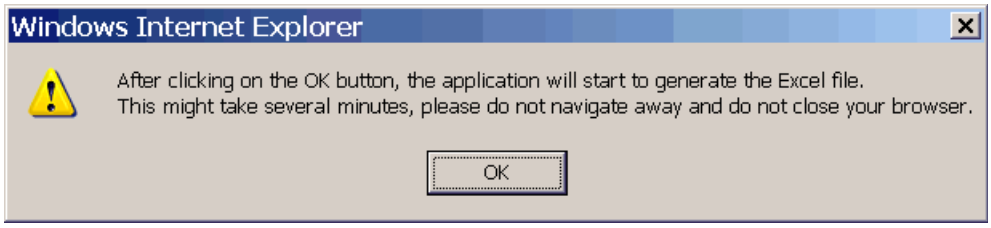

Windows Internet Explorer
After clicking on the OK button, the application will start to generate the Excel file.
This might take several minutes, please do not navigate away and do not close your browser.
OK

Figure 8-23: Export Message

11 Click **OK**; In certain cases a second message is displayed informing that the data may exceed 66,000 lines. Click **OK**; A standard File Save/Download window is displayed.

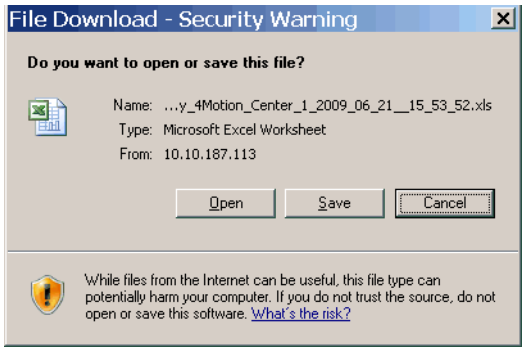

File Download - Security Warning
Do you want to open or save this file?
Name: ...y_4Motion_Center_1_2009_06_21__15_53_52.xls
Type: Microsoft Excel Worksheet
From: 10.10.187.113
Open
Save
Cancel
While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not open or save this software. What's the risk?

Figure 8-24: File Download

The default file naming format is: *StarQuality<Report Name><Date><Time>.* Report name is defined in Step 2.

	B	C	D	E	F	G	H	I
	Report name:	4Motion Center 1		**Generation date:**	2009.06.21. 15:53:52			
	Report type:	BTS		**Created by:**	Administrator			
	Collection date from:	2009.06.20. 00:00:00		**Remark:**	free text			
	Collection date to:	2009.06.21. 00:00:00		**Number of NE:**	1			
	Excel truncated:	No		**Granularity level:**	15 Minutes			
	Timestamp	**BTS name**	**BS**	**Air Link Utilization ALL**	**Average Sector Throughput Uplink**	**Average Sector Throughput Downlink**	**Average Spectral Efficiency all MSs Uplink**	**Average Spectral Efficiency all MSs Downlink**
	2009.06.20. 00:15:00	10.10.184.43	BS 9.9.9	5.4	2623.0	11586.0	0.0	0.0
	2009.06.20. 00:30:00	10.10.184.43	BS 9.9.9	5.4	2540.0	11657.0	0.0	0.0
	2009.06.20. 00:45:00	10.10.184.43	BS 9.9.9	5.4	2618.0	11688.0	0.0	0.0
	2009.06.20. 01:00:00	10.10.184.43	BS 9.9.9	5.4	2523.0	11680.0	0.0	0.0
	2009.06.20. 01:15:00	10.10.184.43	BS 9.9.9	5.4	2594.0	11651.0	0.0	0.0
	2009.06.20. 01:30:00	10.10.184.43	BS 9.9.9	5.4	2560.0	11666.0	0.0	0.0
	2009.06.20. 01:45:00	10.10.184.43	BS 9.9.9	5.4	2598.0	11588.0	0.0	0.0
	2009.06.20. 02:00:00	10.10.184.43	BS 9.9.9	5.4	2559.0	11715.0	0.0	0.0
	2009.06.20. 02:15:00	10.10.184.43	BS 9.9.9	5.4	2617.0	11583.0	0.0	0.0
	2009.06.20. 02:30:00	10.10.184.43	BS 9.9.9	5.4	2571.0	11660.0	0.0	0.0
	2009.06.20. 02:45:00	10.10.184.43	BS 9.9.9	5.4	2585.0	11719.0	0.0	0.0
	2009.06.20. 03:00:00	10.10.184.43	BS 9.9.9	5.4	2557.0	11680.0	0.0	0.0
	2009.06.20. 03:15:00	10.10.184.43	BS 9.9.9	5.4	2603.0	11629.0	0.0	0.0
	2009.06.20. 03:30:00	10.10.184.43	BS 9.9.9	5.4	2556.0	11641.0	0.0	0.0
	2009.06.20. 03:45:00	10.10.184.43	BS 9.9.9	5.4	2582.0	11585.0	0.0	0.0
	2009.06.20. 04:00:00	10.10.184.43	BS 9.9.9	5.4	2562.0	11624.0	0.0	0.0
	2009.06.20. 04:15:00	10.10.184.43	BS 9.9.9	5.4	2623.0	11671.0	0.0	0.0
	2009.06.20. 04:30:00	10.10.184.43	BS 9.9.9	5.4	2648.0	11766.0	0.0	0.0
	2009.06.20. 04:45:00	10.10.184.43	BS 9.9.9	5.4	2628.0	11584.0	0.0	0.0
	2009.06.20. 05:00:00	10.10.184.43	BS 9.9.9	5.4	2999.0	11660.0	0.0	0.0
	2009.06.20. 05:15:00	10.10.184.43	BS 9.9.9	5.4	2751.0	11672.0	0.0	0.0
	2009.06.20. 05:30:00	10.10.184.43	BS 9.9.9	5.4	3211.0	11586.0	0.0	0.0
	2009.06.20. 05:45:00	10.10.184.43	BS 9.9.9	5.4	3166.0	11650.0	0.0	0.0
	2009.06.20. 06:00:00	10.10.184.43	BS 9.9.9	5.4	3133.0	11632.0	0.0	0.0
	2009.06.20. 06:15:00	10.10.184.43	BS 9.9.9	5.4	3212.0	11734.0	0.0	0.0
	2009.06.20. 06:30:00	10.10.184.43	BS 9.9.9	5.4	3170.0	11619.0	0.0	0.0

Figure 8-25: Sample xls File

To export SU data:

1 From Reports select **Bulk Export Wizard**; The Bulk Export Wizard window is displayed (see Figure 8-20).

2 Specify meaningful name and description (free text).

3 Select a time frame, using the input fields or the calendar button: Specify maximum one week. Longer type results in an error message when trying to proceed to the next stage.

INFORMATION

Seconds are ignored; minutes are regarded as the closest quarter of an hour.

4 Select NE Type: SU, and any technology required.

5 Click **BTS Selection** in the path at the top of the work area (see Figure 8-20); the filtering criteria screen is displayed (see Figure 8-21).

6 Enter the following criteria. (All categories are optional, which means if left empty, no filtering is performed. Also all input is according to the search rules described in "Searching Measurements" on page 167):

- Site name
- BTS name
- BTS Address (IP)
- Site ID (as exists in the database)

7 Click **OK**; a list of network elements matching the filter criteria is displayed (see Figure 8-21). You can repeat the filtering until getting the desired results.

8 Select the check-boxes of BTSs you wish to export data from, or use the topmost check-box to select all the BTSs.

9 Click **Sector Selection** in the selection path (see Figure 8-20); A list of all the sectors belonging to the BTSs chosen in Step 8 is displayed.

10 Click **SU Selection** in the selection path; A list of all the SUs belonging to the sectors chosen in Step 9 is displayed.

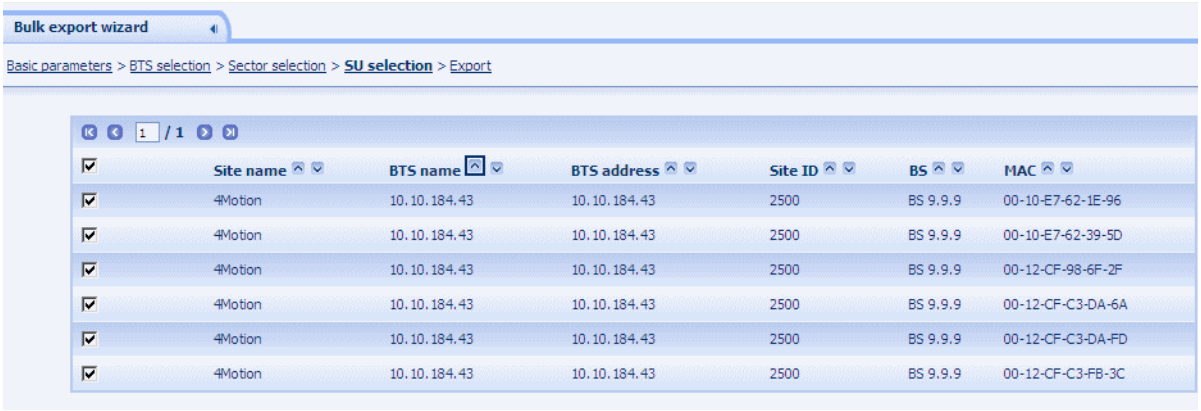


Figure 8-26: SU Selection

INFORMATION

For Steps 8 through 10, the Select All check-box refers only to the currently displayed page. For selecting all the results in all pages, select the check-box separately on each page.

11 Click **Export** in the selection path. The following message is displayed.

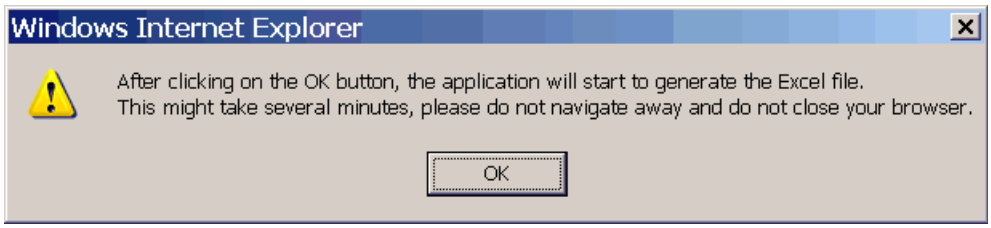

Windows Internet Explorer
After clicking on the OK button, the application will start to generate the Excel file.
This might take several minutes, please do not navigate away and do not close your browser.
OK

Figure 8-27: Export Message

12 Click **OK**; In certain cases a second message is displayed informing that the data may exceed 66,000 lines. Click **OK**; A standard File Save/Download window is displayed.

The default file naming format is: *StarQuality<Report Name><Date><Time>.* Report name is defined in Step 2.

8.6.2 Bulk Export External API

This SQL-based interface is a priced option and requires a specialized licence. It enables:

- Unlimited amount of data (not limited to 65,000 entries)
- Selecting the KPIs to export
- Selecting the time-frame (not limited to one week)

The API outputs data to the database or to any file format. API is documented separately.

Chapter 9 - General Setting Options

In this chapter:

- "Overview" on page 231
- "Site and Equipment Configuration" on page 233
- "Customization" on page 248
- "Templates (admin only)" on page 253
- "Server Configuration and Management (Admin only)" on page 255

9.1 Overview

The Settings item in the main menu contains many options for configuring the StarQuality system. For each item in the submenu panel, different items appear in the Browser, depending on the access rights of the user.

This chapter describes the general setting options available in the StarQuality application for an admin user. Some of the settings are directly involved with the main system functionality, and therefore are described in the relevant chapters throughout this manual. Such settings appear in the following list with a reference to the exact location of their description.

NOTE!

Some of the items are not applicable, therefore are not detailed.

1. **Search** - Setting the searching parameters.Refer to "Searching Objects" on page 130.
2. **Site and equipment configuration** - Creating, deleting and managing elements (refer also to Chapter 3, "Getting Started" on page 118)
3. **Thresholds** - Creating and managing thresholds and their templates. Refer to Chapter 7, "Threshold-Crossing Alarms Monitoring" on page 194
4. **Reports** (admin only)- Creating and managing reports. Refer to Chapter 8, "Reports" on page 204
5. **Customization** - Setting display preferences and e-mail addresses. The other functions are not applicable.
6. **Templates** - Creating, and managing templates for measurements, equipment and thresholds. Importing and exporting templates. Some of the options are not applicable to StarQuality users. Refer to Chapter 6, "Setting Alarm Thresholds" on page 174.

7 **Servers**

- Licences: Displaying and configuring the currently used and available licences
- Device and measurement summary: Viewing the list of all basic equipments, and the number of objects in the system for each measurement type
- Server groups: Not applicable. Configuration of individual measuring groups
- Server configuration: Modifying the measurement servers and other servers
- Start/Stop/Status: Remote management of individual servers
- Server events: Viewing the events that occurred during self-testing
- Collector load: Viewing the load of the collectors and listing the unsuccessful measurements at a given date.

8 **Audit Trail** (admin only): Not applicable. Displaying the individual configuration modifications

9 **User management**: Not applicable

- User admin (admin only): Adding, deleting and modifying users
- User rights (admin only): Configuring which privileges/permissions the users should possess
- Password: Changing password

9.2 Site and Equipment Configuration

9.2.1 Introduction

A StarQuality site can include any combination of sites and/or equipments under it. A collector type defines the site and by default all the elements under it, unless otherwise configured.

The ROOT is a unique site that differs from the above:

- It is the only element in a newly activated system
- It can only have sites directly under it
- It is not defined by a collector type

Using the Site and Equipment Configuration menu item you can search, create, delete, modify and manage sites, equipment and measurements. You can apply your changes to individual elements, or perform a bulk operation over multiple elements.

The following sections describe the available operations, starting from the items in work area, to operations using sub-menus in the Browser (see Figure 9-1):

- Operations in the work area:
  - Navigating, viewing and manipulating single elements (sites and equipments)
  - Using the drop-down menu options
- Operations using the items in the browser:
  - Bulk operations on sites and equipments:
    - Bulk deletion
    - Managing equipments with unsuccessful measurements
    - Managing deactivated equipments
    - Merging inactive sectors
  - Completing gap periods in 4Motion

NOTE!

Some of the items in the browser are not applicable, therefore are not described.

Figure 9-1: Site and Equipment Configuration in the Settings Window

9.2.2 Work Area Operations

This section describes operations that are available via the options in the main working area.

9.2.2.1 Navigation and General Operations

Follow these guidelines:

Table 9-1: General Operations in Site and Equipment Configuration

To	Do this:	Comments
Navigate down the hierarchy (drill-down)	Click the site/equipment icons.	
Navigate up the hierarchy	Do one of the following: ■ Click **OK** or **Cancel** at the bottom of any configuration screen. The system goes one level up ■ Click **Back** ■ Click one of the active links in the path showing the actual location within the hierarchy	The Back button always appears first in the list of sites/equipments in any navigation screen The path starts at the top left hand side of the screen and remains visible even if the page is scrolled.
Edit a site/equipment properties	Click **[edit]**	A site/equipment modification window is displayed with configurable parameters (Figure 9-2)
Delete a site/equipment	Click **[del]**	[del] is displayed only if the equipment or a site has no other network elements under it.
Additional operations in site or equipment levels	Use the **Operation** drop-down menus	Items in the Operations drop-down menus vary depending on hierarchy level.

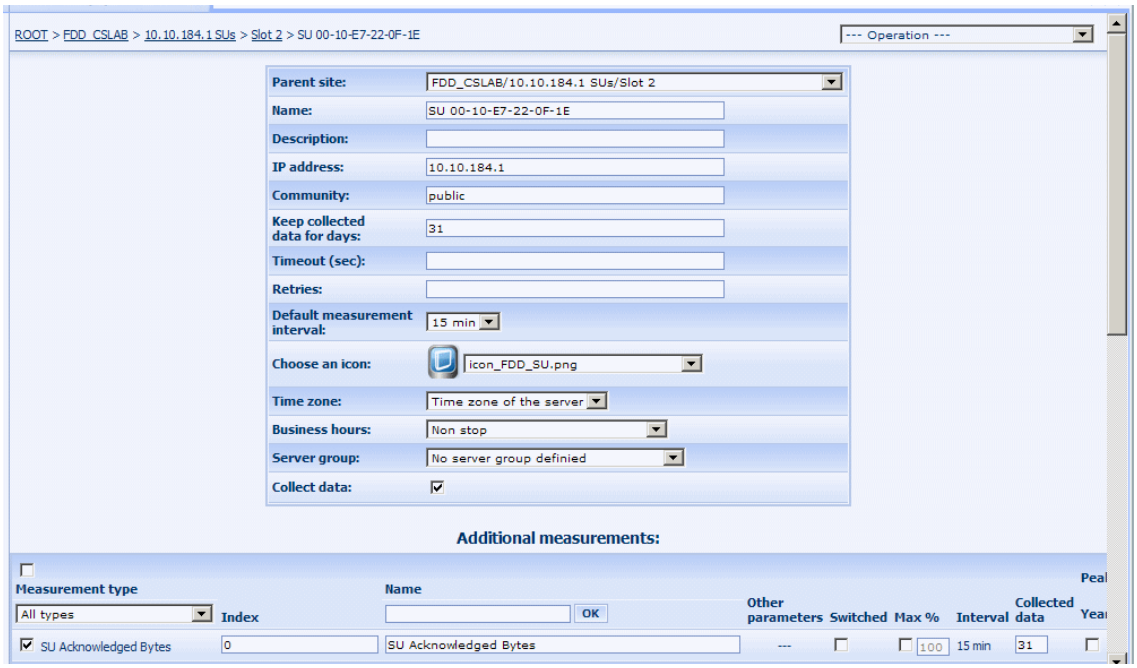


Figure 9-2: Example of Equipment Modification Window

9.2.2.2 Operations in Site Level

Sites can be configured using various operations available in two drop-down menus in the main working area. When located at the sites level of the hierarchy, the Operations drop-down menu at the right-hand side (next to the sites path) provides some navigation and viewing options.

The second Operation drop-down menu, at the top-left of the sites lists, provides operations for creating and modifying sites and equipment. When located at the ROOT level of the hierarchy, the equipment related items are not displayed)

This section describes how to use some of the operations in these menus.

NOTE!

Some of the items in the menus are not applicable, therefore are not described.

To use the path operations drop-down menu (in site level):

The following operations are available for viewing site data (see Figure 9-3):

- **Go to Alarms -** Opens a list of the open alarms under the current branch of the network
- **Go to measurements** - Opens the measurements view of this branch of the network.

- **WiMAX inventory report** - Displays a table of the CPEs connected to the network elements in the current branch of the network. The information includes BTS no., BTS name (by StarQuality), Serving BS, and CPE MAC address.

Path Operations Drop-down Menu

Figure 9-3: Path Operations Drop-down Menu (in Site Level)

To use the site operations drop-down list (in site level):

Follow these guidelines (see Figure 9-4):

Table 9-2: General Operations in Site and Equipment Configuration

To	Select this menu item:	Comments
Create a new site	New Site	Refer to "Operations in Site Level" on page 235
Discover equipment in the site	New equipments (plural) from template	Refer to "Manually Activating WiMAX Devices Discovery" on page 135
Delete multiple elements	Bulk Deletion	Refer to "To delete multiple elements:" on page 238

Figure 9-4: Site Operations Drop-down Menu

9.2.2.3 Operations in Equipment Level

Equipments can be configured using various operations available in one drop-down menu at the right-hand side (next to the sites path).

This section describes how to use some of the operations in this menu.

NOTE!

Some of the items in the menu are not applicable, therefore are not described.

To use the operations drop-down menu (in equipment level):

Follow these guidelines (see Figure 9-5):

Table 9-3: General Operations in Site and Equipment Configuration

To	Select this menu item:	Comments
View active alarms for this equipment	Go to alarms	
View measurements for this equipment	Go to measurements	
Perform discovery and edit this equipment	Modify equipment	Refer to "Operations in Equipment Level" on page 237
Edit this equipment	Modify equipment without discovery	Refer to "Operations in Equipment Level" on page 237

Table 9-3: General Operations in Site and Equipment Configuration (Continued)

To	Select this menu item:	Comments
Start/stop data collection	Activate/Deactivate data collection	Refer to "Activation/Deactivation of Data Collection" on page 139
Create new thresholds	■ New Threshold ■ New group threshold ■ New threshold from template	Not applicable
Edit charts	Edit public charts	Not applicable
View CPEs under this equipment	WiMAX Inventory report	The information includes BTS no., BTS name (by StarQuality), Serving BS, and CPE MAC address.

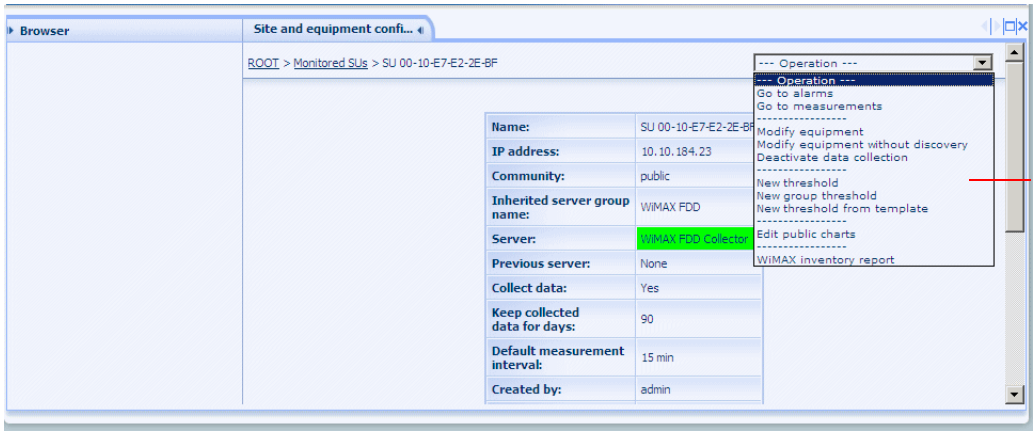


Figure 9-5: Operations Drop-down Menu (in Equipment Level)

9.2.3 Bulk Operations

This section describes that can be applied to multiple elements in the network.

9.2.3.1 Bulk Deletion of Equipment

StarQuality enables deletion of multiple equipments at once. This may be required, for example, in case of migration from 16d to 16e.

To delete multiple elements:

1 Do one of the following:

» Select Settings > Site and Equipment Configuration > Bulk Deletion.

» From the Operations drop-down menu select Bulk Deletion (see Figure 9-4).

The Options window is displayed together with the Search options.

Figure 9-6: Bulk Delete - Simple Search

2 Use the simple or advanced search to filter the elements to delete (see "Searching Objects" on page 130).

3 Use the check-boxes to select the items to delete:

- **Delete non-empty sites** - All the selected sites will be deleted even if they are not empty, including everything below the sites.
- **Delete empty parent objects** - If by deleting an object, its parent is left empty, the parent object is deleted as well. The deletion keeps propagating upward in the hierarchy (if the parent's parent is left empty as a result, it is also deleted and so forth). Empty equipment objects are not affected by this command, requiring distinct confirmation.
- **Delete empty equipments** - If by deleting an object, its parent equipment is left empty, the parent equipment is deleted as well.

4 Click **OK**. The list of all the items that fulfil your search criteria is displayed. You can adjust the search results by entering new search criteria and running a new search.

5 From the list, either select the first check-box to mark all the list for deletion, or select individual items by selecting the corresponding check-boxes.

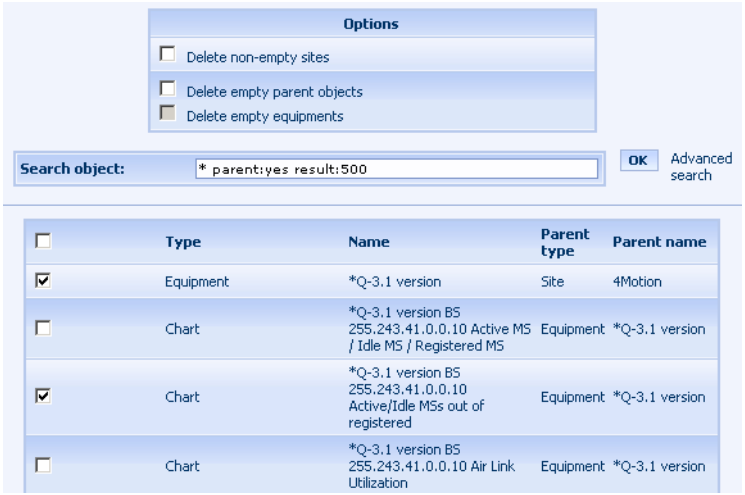


Figure 9-7: Item Selection

6 Click **Select** to finalize.

9.2.3.2 Managing Equipment with Unsuccessful Measurements

StarQuality enables identifying and handling equipments with continuous unsuccessful measurements, either by deleting them from the system or by deactivating their data collection in order to avoid system overhead.

An element appears in the results of "search for unsuccessful measurements" if none of its measurements are successful for the time span defined in the Search parameters.

To manage unsuccessful measurements:

1 Select Settings > Site and Equipment Configuration > Search for unsuccessful measurements. The following search Options window is displayed:

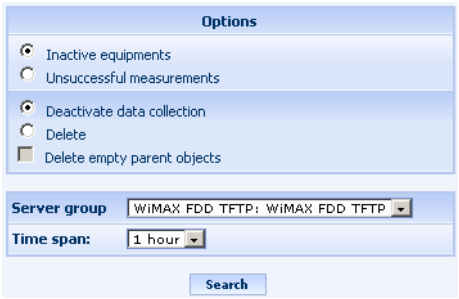


Figure 9-8: Unsuccessful Measurements Search

2 Leave the **Inactive equipments** option selected (equipments for which none of the measurements are successful, or disconnected. The **Unsuccessful measurements** option (measurements for which data is unavailable) is not applicable.

3 Use the check-boxes to select the action for the failed devices:

- **Deactivate data collection** - Stop data collection of inactive equipment
- **Delete** - Remove inactive equipment from the database
- **Delete empty parent objects** - If, as a result of a deletion, a parent object remains empty, it is deleted as well. The empty parent deletion propagates upward through the hierarchy (if the parent's parent is now empty, it is also deleted and so forth).

4 Use the **Server group** drop-down list to select a collector group for your search.

5 Use the **Time span** drop-down list to select for how long the items have been unsuccessful.

6 Click **Search**.The equipment or measurements that match your search criteria are listed below the search box.

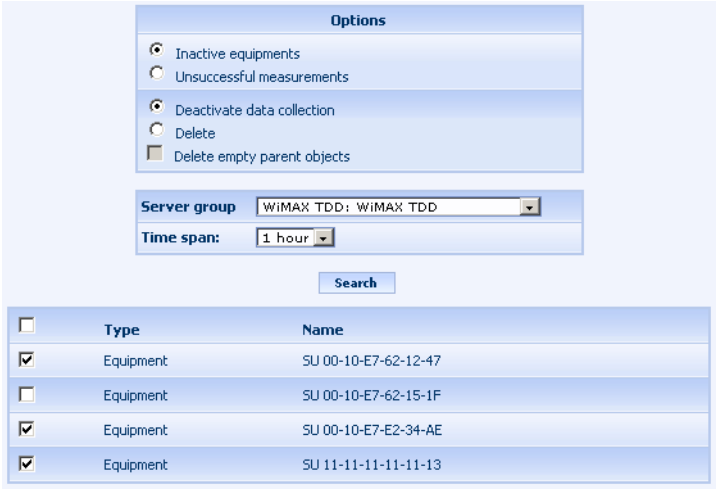


Figure 9-9: Selecting Inactive Equipment

7 From the list, either select the first check-box to mark all the list items for deletion/deactivation, or select individual items by selecting the corresponding check-boxes.

8 Click **Next**. A confirmation page is displayed listing the equipment to be activated or deleted.

Figure 9-10: Inactive Equipment Deactivation Confirmation

9 To change your selection, click **Prev** to return to the previous step.
To proceed with deleting/deactivating, click the **Deactivate data collection** or **Delete** button (depending on your previous selection) to finalize the process.

Upon completion of the process, a result window is displayed.

9.2.3.3 Managing Inactive Equipments

StarQuality enables identifying the full volume of equipments whose collection is deactivated, and either activate or delete them.

An element appears in the results of searching "Bulk inactive equipment activation or deletion" if its collection is turned off (its entry is red).

To reactivate/delete inactive equipment:

1 Select Settings > Site and Equipment Configuration > Bulk Inactive equipment activation or deletion.
The following search Options window is displayed:

Figure 9-11: Inactive Equipment Search

2 Use the check-boxes to select the action for the identified equipment:

- **Activate data collection** - Restart data collection
- **Delete** - Remove inactive equipment from the StarQuality database
- **Delete empty parent objects** (active when selecting the Delete option) - If, as a result of a deletion, a parent object remains empty, it is deleted as well. The empty parent deletion propagates upward through the hierarchy (if the parent's parent is now empty, it is also deleted and so forth).

3 Use the Server Group drop-down menu to select the server group of equipments to search.

4 Click **Search**. The equipment or measurements that match your search criteria are listed below the search box.

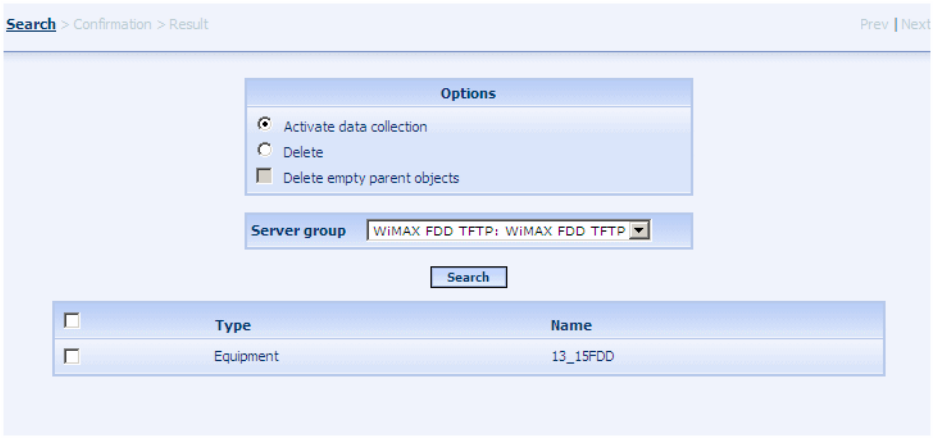


Figure 9-12: Inactive Equipment Deletion Confirmation

5 From the list, either select the first check-box to mark all the list items for deletion/reactivation, or select individual items by selecting the corresponding check-boxes.

6 Click **Confirmation** link at the upper-left part of the page (active if you selected at least one equipment. A confirmation page is displayed, listing the equipment to be activated or deleted.

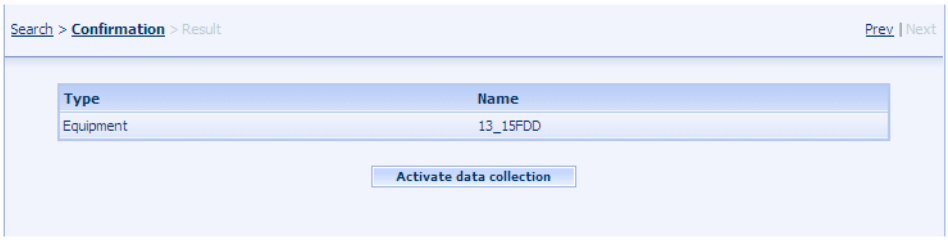


Figure 9-13: Inactive Equipment Deletion Confirmation

7 To change your selection, click **Prev** (at the upper-right of the screen) to return to the previous step. To continue, click **Activate data collection** or **Delete** (depending on your previous selection) to finalize the process.

9.2.3.4 Merging Sector Data Following Sector Name Change

When sector names are changed in a BTS, the system recognize them as new, and they are added to the BTS. The measurements results start from the date of the change, while the previous sector names remain within the scope of the BTS with results only up to the name change date.

StarQuality enables to combine these "old" and "new" sector results, and delete the "old" results, so that the final state is the updated BTS configuration with all the sectors having continuous results across the name-change phase.

A sector (BS/AU) appears in the results of searching "Inactive sector merge" if the alarm for the "BS or AU Not Seen" threshold was raised more than a day before the search.

To merge/delete an inactive sector:

1 Select Settings > Site and Equipment Configuration > Inactive sector merge. The Inactive sector merge window is displayed.

Figure 9-14: Inactive Sector Merge

2 From the list, either select the first check-box to mark all the inactive sectors for merging/deletion, or select individual sectors by selecting the corresponding check-boxes.

3 For each inactive sector, select if to delete or merge with an available sector within the BTS, in the Operation column.

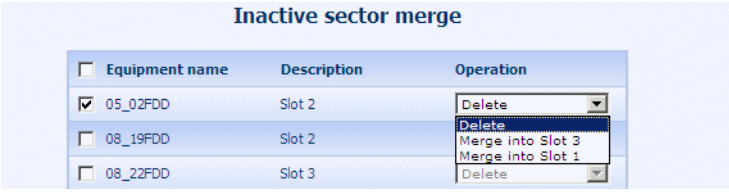


Figure 9-15: Inactive Sector Merge Operations

4 Click **OK**. The merging or deleting process starts without confirmation.

Upon completion of the process, a results message is displayed:

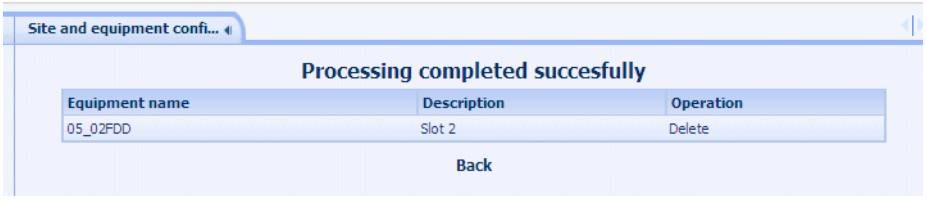


Figure 9-16: Inactive Sector Merge Process Completion

9.2.4 4Motion Data Collection Gap Filling

StarQuality enables manual initiation of compensating for data collection gaps in 4Motion.

The scope for gap filling is:

- Previous 24 hours only
- Unlimited number of BTSs

Examples of causes for collection gaps that can be filled using this mechanism:

- StarQuality was inactive
- No communication between StarQuality and BTS

Examples of cases for which the mechanism will not perform gap filling:

- BTS was inactive
- BTS PM collection was disabled or partial

NOTE!

The results added by the gap filling mechanism are available for display and bulk export, but do not initiate threshold violations, and will not be taken into account for StarQuality built-in reports.

To fill up 4Motion collection gaps:

1. From Settings, select Site and equipment configuration > Fill WiMAX 4Motion collection gaps. The standard Search window is displayed.
2. Fill in the search criteria. For searching the whole network, type * in the Search field and edit the number of entries accordingly.
3. Click **OK**. A list of results is displayed, showing the matching BTSs.
4. Use the check-boxes to select the BTSs in which to search for gaps within the last 24 hours. For the whole network select the upper check-box.

Figure 9-17: Search for Collection Gaps

5 Click the **Search for collection gaps** link at the top-left of the window (active only if at least one BTS is selected).

If no collection gaps are found, the following message is displayed:

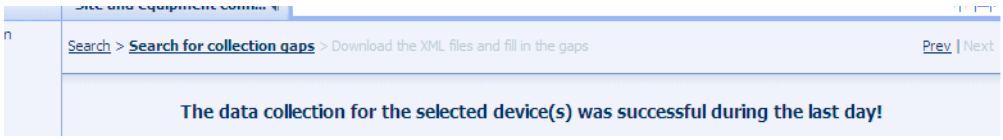

Search > Search for collection gaps > Download the XML files and fill in the gaps
Prev | Next
The data collection for the selected device(s) was successful during the last day!

Figure 9-18: No Collection Gaps Notification

If gaps were found, a list of results is displayed, showing missing collection intervals, their dates and reasons.

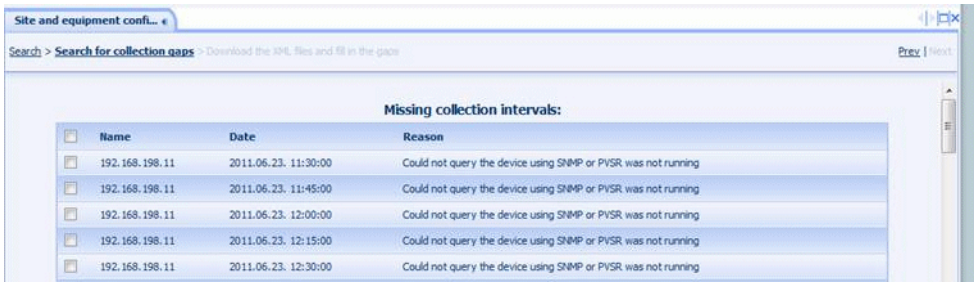

Site and equipment confi...
Search > Search for collection gaps
Prev | Next
Missing collection intervals:
Name
Date
Reason
192.168.198.11 2011.06.23. 11:30:00 Could not query the device using SNMP or PVSR was not running
192.168.198.11 2011.06.23. 11:45:00 Could not query the device using SNMP or PVSR was not running
192.168.198.11 2011.06.23. 12:00:00 Could not query the device using SNMP or PVSR was not running
192.168.198.11 2011.06.23. 12:15:00 Could not query the device using SNMP or PVSR was not running
192.168.198.11 2011.06.23. 12:30:00 Could not query the device using SNMP or PVSR was not running

Figure 9-19: Missing Collection Intervals

6 From the list, either select the first check-box to mark all the BTSs for filling gaps, or select individual BTSs by selecting the corresponding check-boxes.

7 Click the **Download the XML and fill in the gaps** link top of the screen (active once you choose at least one BTS for gap filling).

StarQuality downloads the files, processes them and loads them into the database. During the operation it displays the progress.

Site and equipment confi...
Search > Search for collection gaps > Download the XML files and fill in the gaps
Prev | Next
Please wait...
Collection in progress: 1/95
Currently collecting: Date 2011.06.23. 11:30:00 Equipment 192.168.198.11
Cancel

Figure 9-20: Collection Filling Progress

To stop the operation, click **Cancel**.

Upon completion, a results message is displayed

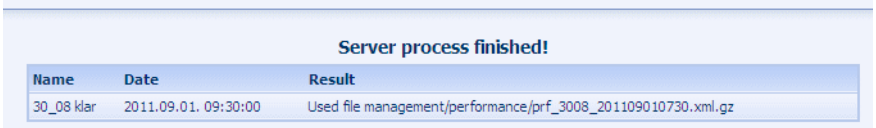


Figure 9-21: Collection Filling Progress

9.3 Customization

In the Customization menu item (you can make user-specific settings (non-administrator users) and system level settings (admin users).

The following settings are available from the browser:

- **Public charts** - Not applicable - Configuring charts (Admin only)
- **Public menu items** (Admin only) - Not applicable. Adding menu items to the Measurement and Alarms pages (Admin only).
- **Creating External Links** - Not applicable. Connect the StarQuality to any WEB based application or to a WEB page (e.g. equipment documentation).
- **Preferences** - Setting display options and user preferences
- **Setting E-mail Addresses (Admin only)** - Setting an e-mail address to which the system can send notifications on threshold violations.

NOTE!

Some of the items in the browser are not applicable, therefore are not described.

9.3.1 Setting Preferences

You can define and configure display options and various GUI behavior using the Customization window.

To set preferences:

1 From Settings select Customization > Preferences. The Preferences window is displayed.

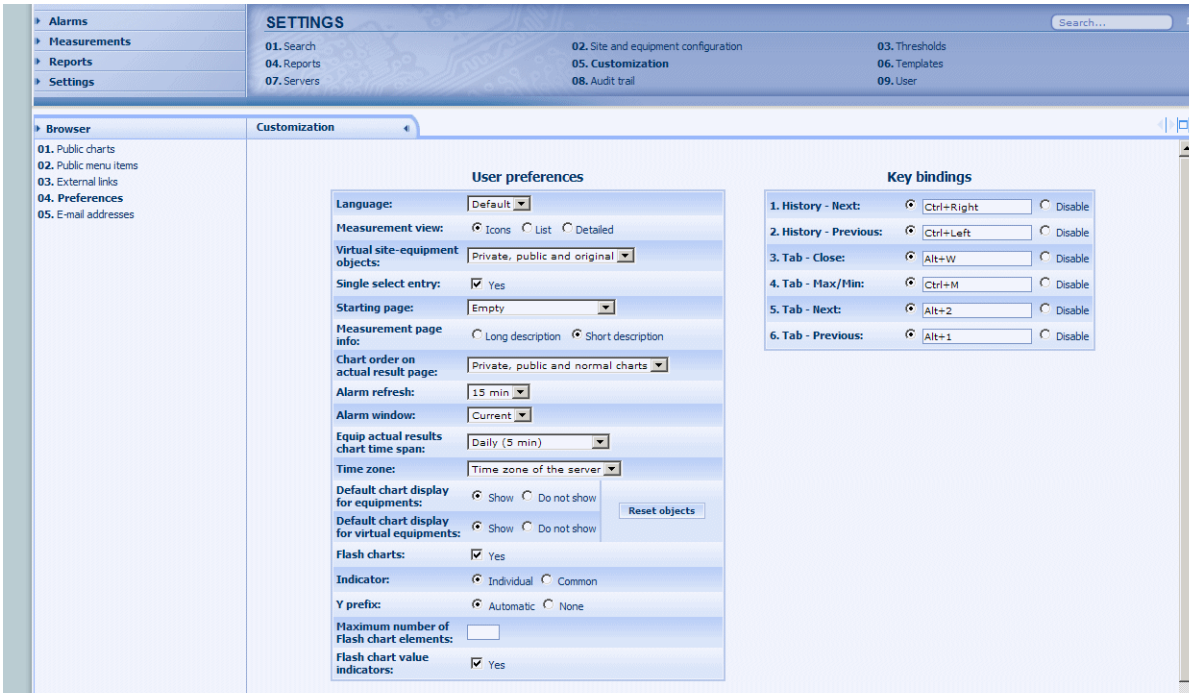


Figure 9-22: Preferences

2 Select the options to set as your system default:

Table 9-4: User Preferences

Item	Description
Language	Select the GUI language
Measurement view	Select the default view when opening the Measurement page: Icons, List, or Detailed
Virtual site-equipment objects	Not Applicable. Select whether the private and public virtual, or the default hierarchy should be displayed below the current measurements submenu.
Single select entry	If this option is set to Yes: ■ Under the Equipment search, the equipment will be immediately displayed if the search has a single result only ■ Under the current measurements menu item, the page for a piece of equipment will be displayed immediately if the user has the rights for a single piece of equipment only ■ The elements of a site will also be displayed if only a single site can be accessed.

Table 9-4: User Preferences (Continued)

Item	Description
Starting page	Select the page to be displayed upon login: ■ Empty ■ Alarms: ROOT ■ Measurements: Search ■ Measurements: ROOT
Measurement page info	Select the way to display information about measurements: ■ Long description ■ Short description
Chart order on actual result page	Select whether, and in what order, the public and/or private charts should be displayed on the Measurement page accessed through the current Measurements menu item.
Alarm refresh	Select the refreshing interval when displaying alarms in real-time mode.
Alarm window	If viewing the alarms in real-time mode, select if to display only the current alarms or also the alarms from the past time interval
Equip actual results chart time span	Select the resolution and automatic refresh time of the charts in Alarms an Measurements: ■ Last minutes (15 sec) ■ Last hours (1 min.) ■ Daily (5 min.) ■ Weekly (30 min.) ■ Monthly (2 hour) ■ Annual (1 day)
Time zone	Time zone of the server
Default chart display for equipments	Select if to expand or collapse the charts in Measurements. StarQuality remembers the choice for every chart you change locally in the Measurements window. Here you can set the default or reset your local choices. ■ Show - expand chart ■ Do not show - collapse chart (recommended) ■ Reset objects - delete local settings and reset to default
Default chart display for virtual equipments	
Flash charts	Select Yes to use the Flash-based charts by default
Indicator	Not applicable
Y prefix	Not applicable

Table 9-4: User Preferences (Continued)

Item	Description
Maximum number of Flash chart elements	Set the number of the elements on each chart, to save memory and CPU usage. The visible charts are always drawn regardless of this value, i.e. if the value is set to 0, only the visible charts are drawn. If the value is not set, the application takes the value set on the server side and if that is not set either then its value is 40.
Flash chart value indicators	If this option is set and the chart has four or less elements then by default these values are shown. Regardless of the preference settings, you can turn these indicators on and off at any time.

3 In the Key Bindings table, set the shortcut keys for some frequent operations: Click in the editable text field and press the desired key combination.

9.3.2 Setting E-mail Addresses (Admin only)

All users (except limited ones) may set up one or more e-mail address to which the system can send notifications on threshold violations.

A prerequisite to the actual e-mail sending is that the StarQuality server has been configure with an active SMTP server.

To set an e-mail address:

1 From Settings > Customization select E-mail Addresses; A list of addresses appears.

2 Click **[add new]**; The E-mail Address Configuration window is displayed.

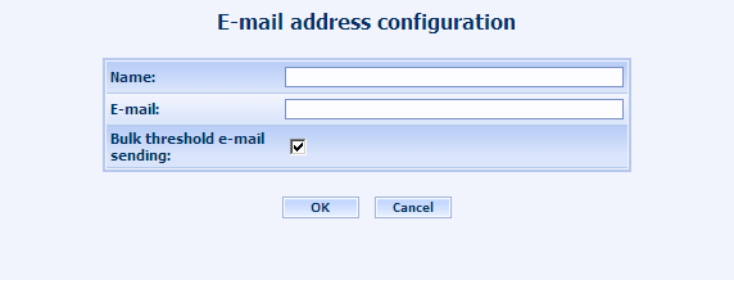


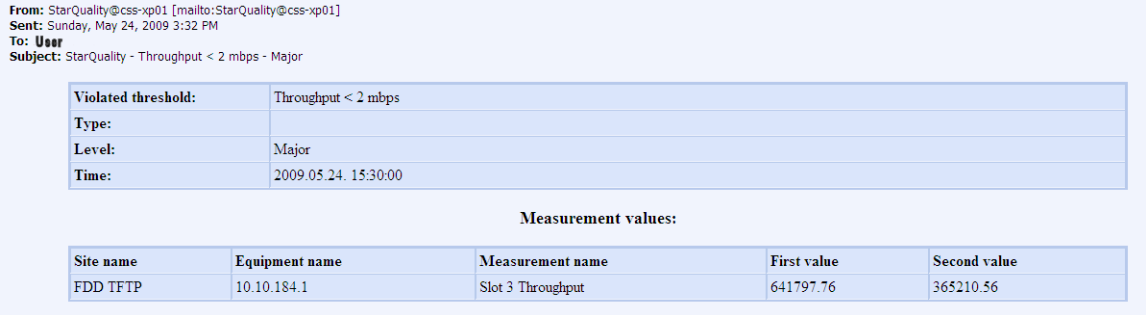
Figure 9-23: E-mail Address Configuration

3 Specify the following:

» **Name:** It must be unique for each user. This name will appear in the selection list for in the Thresholds Configuration window.

» **E-mail:** The e-mail address to where the messages should be sent.

» **Multiple threshold violations in one mail:** In case of a single sampling interval in which multiple threshold violations occurred, it is possible to send the notification in a single e-mail (bulk) instead of sending them separately. The bulk mail is less detailed than the separate e-mail.



From: StarQuality@css-xp01 [mailto:StarQuality@css-xp01]
Sent: Sunday, May 24, 2009 3:32 PM
To: User
Subject: StarQuality - Throughput < 2 mbps - Major

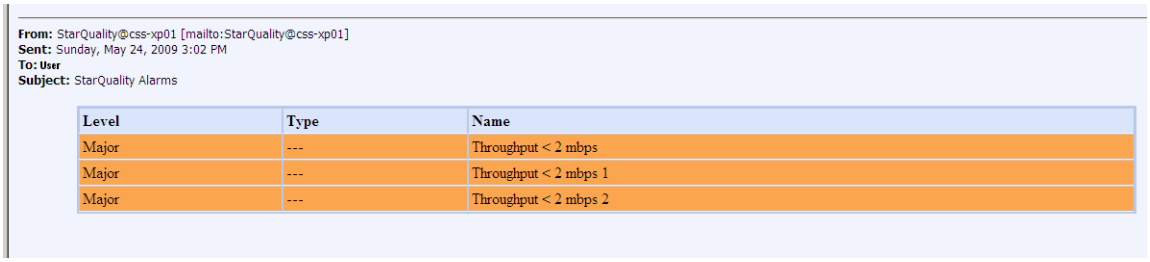
Violated threshold:	Throughput < 2 mbps
Type:	
Level:	Major
Time:	2009.05.24. 15:30:00

Measurement values:

Site name	Equipment name	Measurement name	First value	Second value
FDD TFTP	10.10.184.1	Slot 3 Throughput	641797.76	365210.56

Figure 9-24: Example of Separate Threshold Violation Notification

9.4 Templates (admin only)


From: StarQuality@css-xp01 [mailto:StarQuality@css-xp01]
Sent: Sunday, May 24, 2009 3:02 PM
To: User
Subject: StarQuality Alarms

Level	Type	Name
Major	---	Throughput < 2 mbps
Major	---	Throughput < 2 mbps 1
Major	---	Throughput < 2 mbps 2

Figure 9-25: Example of Bulk Threshold Violation Notification

In the Templates menu item, you can create and manage templates for measurements, equipment and thresholds.

NOTE!

Some of the items in the browser are not applicable, therefore are not described. The applicable items are described in Chapter 6, "Setting Alarm Thresholds" on page 174.

The following settings are available from the browser:

- **MIB upload** - Not applicable.Uploading the SNMP MIBs files to the system
- **Measurement type definitions** - Not applicable. Editing measurement definitions
- **Equipment templates** - Not applicable. Editing equipment templates
- **Threshold templates** - Editing threshold templates (Refer to "Creating and Editing Threshold Templates" on page 176)
- **Threshold template export/import** - (Refer to "Importing and Exporting Threshold Templates" on page 183
- **Chart templates** - Not applicable. Editing chart templates**.**
- **Exclusion window template** - Defining time frames in which thresholds can be activated/deactivated
- **Time zones** - setting the time zone according to place of use

Figure 9-26: Setting Templates Window

9.5 Server Configuration and Management (Admin only)

In the Servers menu item, you can manage users licences, servers discovery and configuration, and collection parameters. The following settings are available from the browser:

- "Licence Configuration" on page 256
- "Device and Measurement Summary" on page 258
- "Server Configuration" on page 259
- "Start/Stop/Status of Servers" on page 263
- "Viewing Server Events" on page 264
- "Viewing Collector Load Information" on page 265

NOTE!

Some of the items in the browser are not applicable, therefore are not described.

9.5.1 Overview

Server configuration and management refers to two server types:

- Default server: e.g. the application manager or the report counting server. The number of servers cannot be extended or limited.
- Measurement servers: arbitrary number of these can exist and each must belong to a measurement server group. There are three types of measurement servers matching the types given for the measurement server groups:
  - » Active and discoverable: the measurements are actively made by the StarQuality application through the available API. The measurements supported by discoverable equipment can be discovered or queried through a suitable management protocol: e.g. the list of interfaces on network equipment or the list of disk partitions on a UNIX server. These are discovered and automatically monitored by the StarQuality (e.g. it automatically deletes them if the measurement has ended or the measurement name has changed). Even though the StarQuality automatically searches the measurements in such a case, they can also be manually recorded. If such a measurement is created, subsequent automatic discovery will not occur. Accordingly, if the measured object is deleted from the active equipment, it will not disappear from the StarQuality. This type of measurement will again be monitored automatically only if a new manual discovery is performed on the equipment through the web interface and it is saved afterwards. For certain

discoverable servers there are measurement types (e.g. servers measuring IPSec) where no discovery is performed.

- Active but non-discoverable: the measurements are actively made by the StarQuality application through the available API, but it is impossible to discover and monitor the measurements of the equipment. This is typical when parameters need to be set for the measuring system in order to start the measurements (e.g. one or more WEB server addresses should be given to measure HTTP services).
- Passive and optionally capable of auto-discovery: the StarQuality only collects files containing measurement values in certain defined formats, and optionally records and deletes the pieces of equipment and measurements based on the collected data.

The Servers menu includes five submenus, described herein.

9.5.2 Licence Configuration

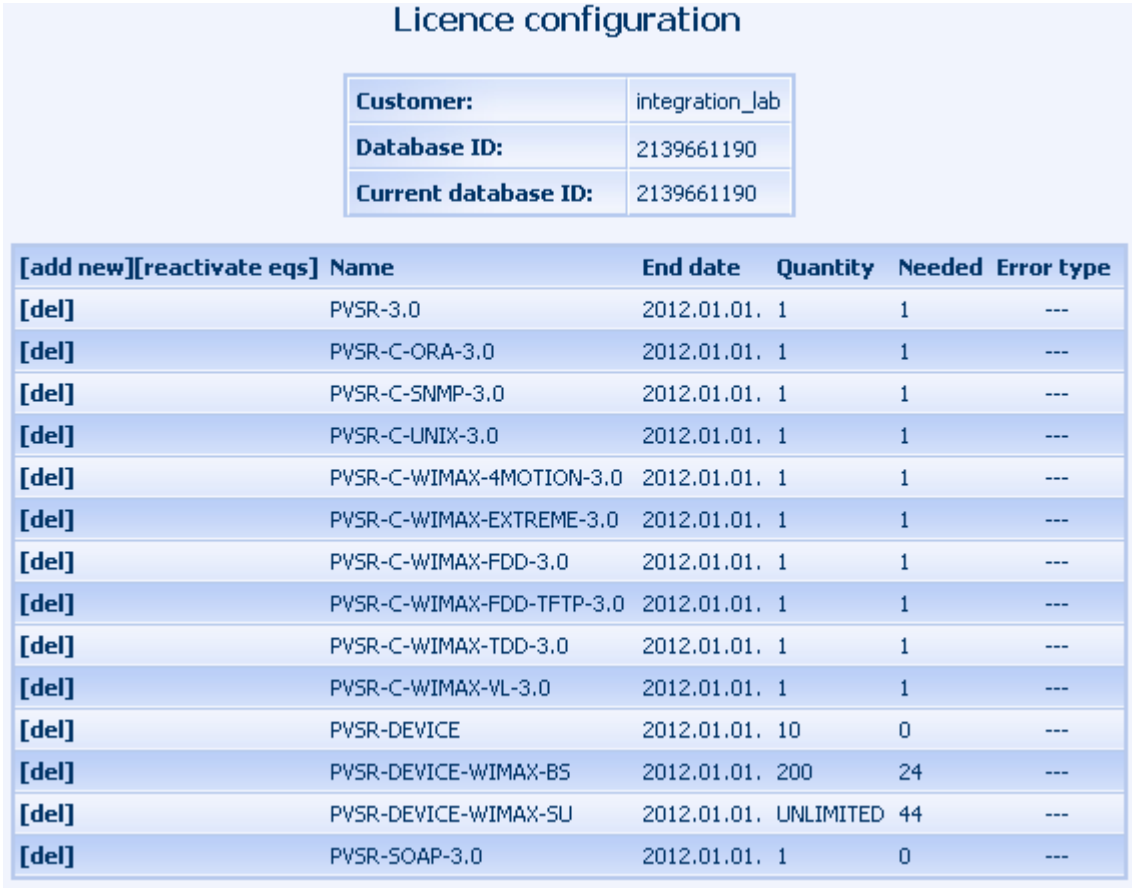
9.5.2.1 Overview

The licence for StarQuality is an encrypted file which defines:

- Validity period - either unlimited or temporary.
- Number of collector Network Elements (NEs) of any type - BTSs only (disregarding the number of AUs under each BTS. No. of SUs is unlimited, except for FDD 3.5/3.6: 10 SUs per BTS).

The installation CD includes a temporary licence file for a limited period of time and limited number of NEs.

To acquire the permanent licence, access the Alvarion on-line feature licence application (refer to *Getting Feature Licenses* Guide). You will be required to provide the Oracle database ID. You can find it by accessing Settings > Servers > Licenses. The database ID will be displayed at the top of the page, as shown in Figure 9-27.



Licence configuration

Customer:	integration_lab
Database ID:	2139661190
Current database ID:	2139661190

[add new][reactivate eqs]	Name	End date	Quantity	Needed	Error type
[del]	PVSR-3.0	2012.01.01.	1	1	---
[del]	PVSR-C-ORA-3.0	2012.01.01.	1	1	---
[del]	PVSR-C-SNMP-3.0	2012.01.01.	1	1	---
[del]	PVSR-C-UNIX-3.0	2012.01.01.	1	1	---
[del]	PVSR-C-WIMAX-4MOTION-3.0	2012.01.01.	1	1	---
[del]	PVSR-C-WIMAX-EXTREME-3.0	2012.01.01.	1	1	---
[del]	PVSR-C-WIMAX-FDD-3.0	2012.01.01.	1	1	---
[del]	PVSR-C-WIMAX-FDD-TFTP-3.0	2012.01.01.	1	1	---
[del]	PVSR-C-WIMAX-TDD-3.0	2012.01.01.	1	1	---
[del]	PVSR-C-WIMAX-VL-3.0	2012.01.01.	1	1	---
[del]	PVSR-DEVICE	2012.01.01.	10	0	---
[del]	PVSR-DEVICE-WIMAX-BS	2012.01.01.	200	24	---
[del]	PVSR-DEVICE-WIMAX-SU	2012.01.01.	UNLIMITED	44	---
[del]	PVSR-SOAP-3.0	2012.01.01.	1	0	---

Figure 9-27: Licence Configuration Screen

9.5.2.2 Managing Licences

The Licences submenu is available only for admin users. You can edit the license table and compare the number of available and required licences. If there are fewer licences available than required for operating the system, or any of the licenses has expired, then users receive a warning message during the login process.

Licence data can only uploaded and deleted but not edited. The individual columns are:

- Editing links:
  - **[add new]**: adding a new licence file
  - **[del]**: deleting a licence entry
- **Name:** Name of the licence
- **End date:** Expiration date of the given licence. If it is unlimited, then use “never”
- **Quantity:** Quantity of licences in the system. Can be unlimited.
- **Needed:** Quantity required to operate the system

- **Error type:** In those rows where the licence is invalid an error message is shown and the row is displayed in red. Possible error messages:
  - » Wrong checksum: invalid line since someone directly modified the licence entry
  - » Expired: licence was valid for a limited period only which has expired
  - » No licence found: the given licence entry is required but not found
  - » Low licence quantity: the quantity of the given licence is not enough for the system

A licence can be added by providing a licence file. During this process the application keeps the already existing licence entries or modifies them if they exist in the file.

To add a new licence:

1. Place the licence file on the computer from which you activated the client.
2. From Settings select Servers; the Servers tab is displayed.
3. Select Licences. The Licences Configuration window is displayed.
4. Click **[add new]** and browse for the file containing the license.
5. Click **OK**. A list detailing the licenses is displayed.
6. Verify that the entry in the license list is not colored red.

9.5.3 Device and Measurement Summary

You can display a list of all basic equipments, and for each measurement type - the number of objects in the system.

To use the summary list:

From Settings select Servers > Device and Measurement Summary; A table of all devices is displayed, indicating the site and equipment name, IP address, F H C A and total number of measurements.

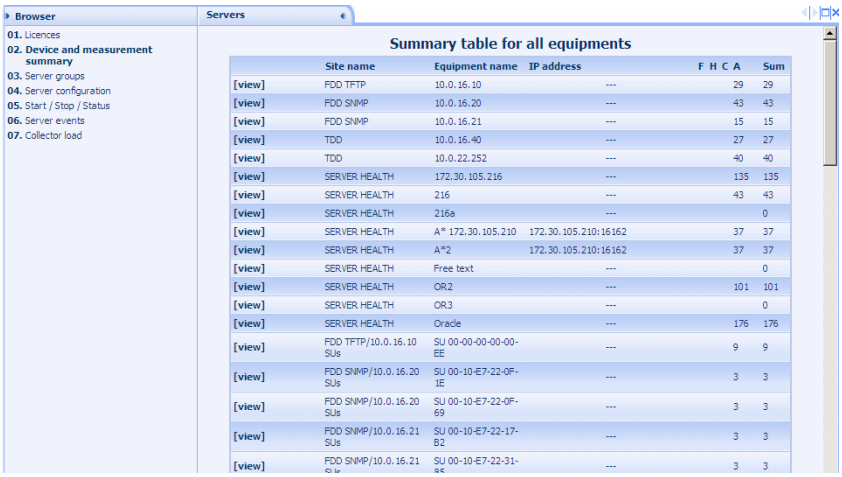

Browser
01. Licences
02. Device and measurement summary
03. Server groups
04. Server configuration
05. Start / Stop / Status
06. Server events
07. Collector load
Servers
Summary table for all equipments
Site name
Equipment name
IP address
F H C A
Sum
[view] FDD TFTP 10.0.16.10 --- 29 29
[view] FDD SNMP 10.0.16.20 --- 43 43
[view] FDD SNMP 10.0.16.21 --- 15 15
[view] TDD 10.0.16.40 --- 27 27
[view] TDD 10.0.22.252 --- 40 40
[view] SERVER HEALTH 172.30.105.216 --- 135 135
[view] SERVER HEALTH 216 --- 43 43
[view] SERVER HEALTH 216a --- 0
[view] SERVER HEALTH A* 172.30.105.210 172.30.105.210:16162 37 37
[view] SERVER HEALTH A*2 172.30.105.210:16162 37 37
[view] SERVER HEALTH Free text --- 0
[view] SERVER HEALTH OR2 --- 101 101
[view] SERVER HEALTH OR3 --- 0
[view] SERVER HEALTH Oracle --- 176 176
[view] FDD TFTP/10.0.16.10 SUs SU 00-00-00-00-00-EE --- 9 9
[view] FDD SNMP/10.0.16.20 SUs SU 00-10-E7-22-0F-1E --- 3 3
[view] FDD SNMP/10.0.16.20 SUs SU 00-10-E7-22-0F-69 --- 3 3
[view] FDD SNMP/10.0.16.21 SUs SU 00-10-E7-22-17-B2 --- 3 3
[view] FDD SNMP/10.0.16.21 SU 00-10-E7-22-31- --- 3 3

Figure 9-28: Device and Measurement Summary

9.5.4 Server Configuration

Server configuration is available for the admin users only. You can add new servers, or delete and modify existing servers.

To access the Server Configuration:

1. From the main menu select Settings.
2. From the Settings panel select Servers > Server Configuration; A list of all configured servers is displayed.

[add new]	ID	Name	Status	Type	Server group	Host	Login	Pwd	Directory	Param1	Param2
[edit]	1	Application manager	Running	MANAGER	---	localhost	Administrator	---	/opt/starquality	60	30000
[edit]	2	SQLLDR	Running	SQLLDR	---	localhost	Administrator	---	/opt/starquality	---	---
[edit]	3	Threshold processing	Running	THRESH	---	localhost	Administrator	---	/opt/starquality	6	---
[edit]	4	Job processing	Running	JOB	---	localhost	Administrator	---	/opt/starquality	---	---
[edit]	5	Report calculation	Running	REPORT	---	localhost	Administrator	---	/opt/starquality	6	---
[edit]	6	Data compression	Running	COMP	---	localhost	Administrator	---	/opt/starquality	03:00	---
[edit]	7	Data migration	Running	MIGR	---	localhost	Administrator	---	/opt/starquality	01:00	---
[edit]	8	Chart server	Running	CHART	---	localhost	Administrator	---	/opt/starquality	---	---
[edit]	9	Scheduled reports	Running	SCHED	---	localhost	Administrator	---	/opt/starquality	---	---
[edit][del]	10	SNMP Collector	Running	SNMP	SNMP	localhost	Administrator	---	/opt/starquality	Y	---
[edit][del]	11	Oracle Collector	Running	Oracle	Oracle	localhost	Administrator	---	/opt/starquality	Y	---
[edit][del]	12	Unix/Linux Collector	Running	Unix/Linux	Unix/Linux	localhost	Administrator	---	/opt/starquality	Y	---
[edit][del]	13	WiMAX FDD Collector	Running	WiMAX FDD	WiMAX FDD	localhost	Administrator	---	/opt/starquality	Y	---

Figure 9-29: Server Configuration Window

The following information is displayed in the table:

- **ID:** unique identifier of the server. It is used when starting and halting the server from the command line, or when displaying the summary of the collected data for the measurement servers.
- **Name:** the name of the server
- **Status:** status of the server: running, not running, or unknown; Refer to "Editing Server Configuration" on page 261
- **Type:** the type of the server; or the type of the server group for collector servers: SOAP, Manager, Event
- **Server group:** for a measurement server the name of its group
- **Host:** the host computer of the server
- **Login:** the user name used to login to the machine
- **Pwd:** user password. If it is not set, the application can still log in if SSH key-based authentication is configured
- **Directory:** the directory of the StarQuality application. The name of the directory should be an absolute path (i.e. it should started with /)

- **Param1 and Param2:** Further parameters depending on the type of the server, displayed with the appropriate name.
  - » Measurement server:
    - ◊ Persistent SSH and SFTP connection (Param1): Whether the SQLLDR and the MANAGER server can keep a persistent SSH and SFTP connection with the measurement server or not. Persistent connection is strongly recommended since nonessential logins and logouts can be avoided. There is only one case when non-persistent connection is necessary: in the case of certain former SSH implementations the established SFTP connection has fully utilized the CPU of the target machine, even when no operation was executed
    - ◊ How many seconds should the system wait for collector result if it is not running (Param2).
  - » **Application manager:**
    - ◊ Cycle (in sec): The number of seconds waited between server monitoring
    - ◊ Number of files: During self-testing the system checks the number of files in the tmp/done directory that executes the data loading component. If this is higher than the value specified here, the system generates a server event and notifies the operator.
  - » **Data compression and moving and partition creation:** the time of running (HH:MM): These servers execute operations once a day (though they are continuously running). Partition creation is an exception since the daily operation is executed immediately at startup.
  - » **Threshold procession and report creation:** the maximum time period (in hours) of former data to be processed at startup. At startup both of these servers determine the time up to which the individual thresholds as well as report variables were processed, and if the hour of the last processing is smaller than the current hour minus the specified time period, then they consider the processing to be done up to the current hour minus the specified time period. For example: if the five-minute thresholds were processed by the server up to 8:55, and it is restarted at 18:05 (same day), and the set value is 6, then processing will only be continued from 12:00

9.5.4.1 Editing Server Configuration

During the configuration of the servers the following fields can be modified: name, host, login, password and the optional parameters. The host, login and directory parameters can only be modified if the given server is not running.

To edit a server configuration:

1 Click **[edit]** next to one of the entries; the Server Configuration editing window is displayed.

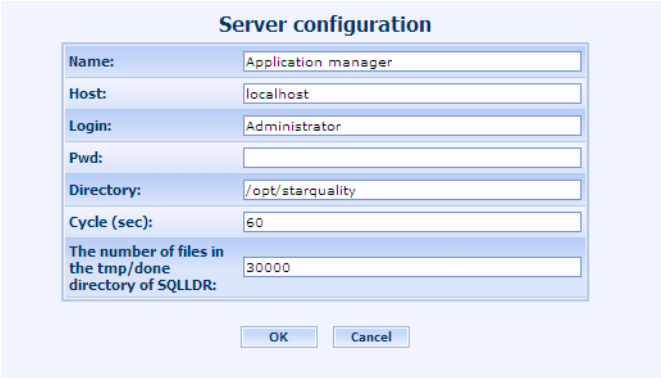


Figure 9-30: Editing Server Configuration

2 Specify the required information: name, host, login, password and the optional Param1 and Param2.

3 Click **OK**.

9.5.4.2 Adding a New Server

Adding and deleting a server is possible for measurement, SOAP, secondary application manager and secondary event receiver servers.

When a measurement server is added, a server group is also added to the table in the Server Configuration window.

To add a new server:

1 In the Server Configuration window, click **[add new]**; The server Configuration editing window is displayed.

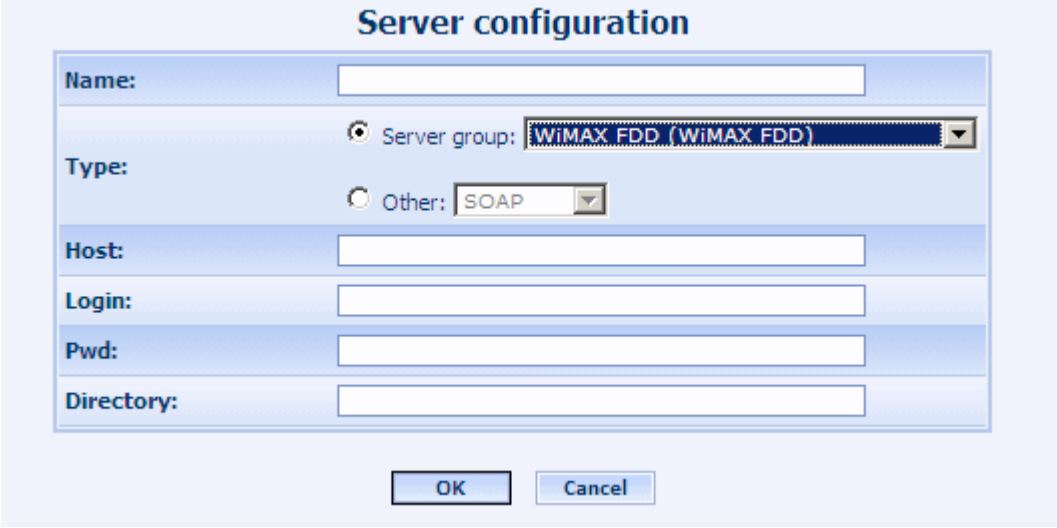


Figure 9-31: Server Configuration - Adding New

2 Specify the required information: Name, type, host, login, password and directory.

3 Click **OK**.

9.5.5 Start/Stop/Status of Servers

This feature is available for the admin and administrator users only. The page displays the current status of servers by color coding. The columns of the table are identical to the table in "Server Configuration" on page 259 (except for password). You can start and stop the servers and check for their status manually, in addition to the automatic server check of the application manager.

The page is continuously refreshed. After starting and stopping server(s) the subsequent refreshing also checks their status.

The servers can be in three different statuses: Running, Not running and Unknown. Unknown status means that it cannot be determined whether the server is running or not: for example it is impossible to login with the specified data to the computer running the server.

Only measurement servers with "running" statuswill be assigned to measure equipments. A server may be configured to the equipment, and another server is modified to be a secondary measurement server. Each measurement server measures all those pieces of equipment where it is a primary or secondary server, and after a certain period it deletes secondary server registrations where it is the primary server. Due to this algorithm no measurement would be omitted even if, for example in a measurement server group, one of the servers is started when another server has already been run: even though load balancing transfers a certain part of the equipment, both of them will measure the transferred pieces of equipment temporarily.

To use the Server Start/Stop/Status window

1 From Settings select Servers > Start/Stop/Status. A list of all servers is displayed. Running servers are colored green, Not running servers are colored red.

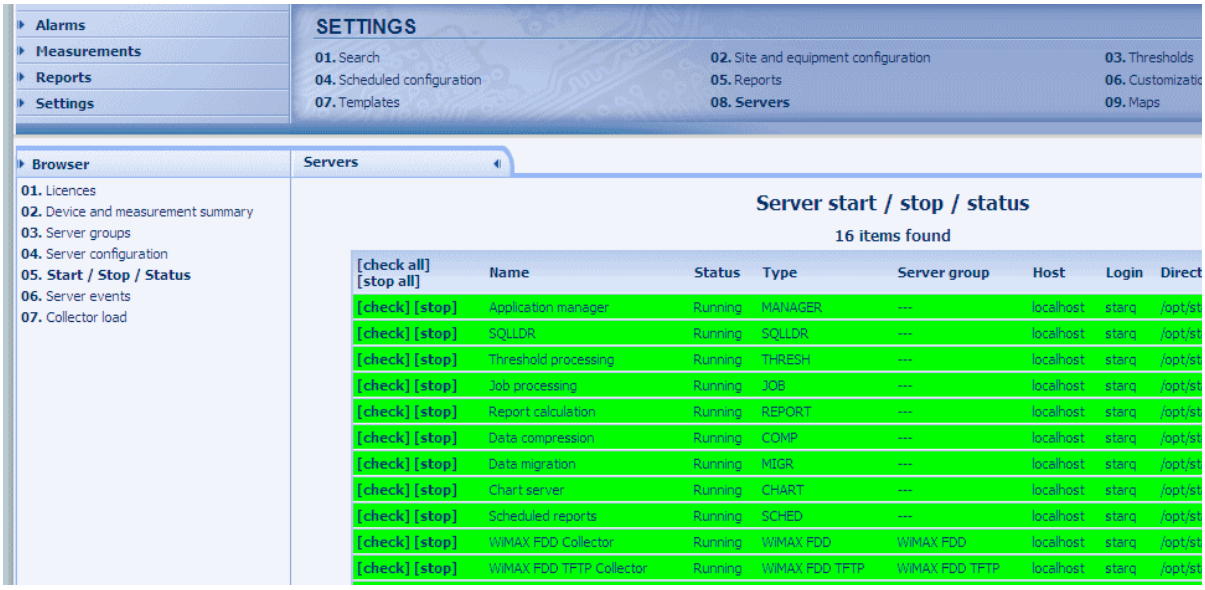

Alarms
Measurements
Reports
Settings
SETTINGS
01. Search
02. Site and equipment configuration
03. Thresholds
04. Scheduled configuration
05. Reports
06. Customizatic
07. Templates
08. Servers
09. Maps
Browser
01. Licences
02. Device and measurement summary
03. Server groups
04. Server configuration
05. Start / Stop / Status
06. Server events
07. Collector load
Servers
Server start / stop / status
16 items found
[check all] [stop all]
Name
Status
Type
Server group
Host
Login
[check] [stop] Application manager Running MANAGER --- localhost starq
[check] [stop] SQLLDR Running SQLLDR --- localhost starq
[check] [stop] Threshold processing Running THRESH --- localhost starq
[check] [stop] Job processing Running JOB --- localhost starq
[check] [stop] Report calculation Running REPORT --- localhost starq
[check] [stop] Data compression Running COMP --- localhost starq
[check] [stop] Data migration Running MIGR --- localhost starq
[check] [stop] Chart server Running CHART --- localhost starq
[check] [stop] Scheduled reports Running SCHED --- localhost starq
[check] [stop] WiMAX FDD Collector Running WiMAX FDD WiMAX FDD localhost starq
[check] [stop] WiMAX FDD TFTP Collector Running WiMAX FDD TFTP WiMAX FDD TFTP localhost starq

Figure 9-32: Server Status

2 Click either **Start** or **Stop** to change the status, or **Check** to manually check and refresh the status.

9.5.6 Viewing Server Events

The application manager module (or modules if the secondary application manager is also installed) periodically performs different verifications in connection with the database and the machines running StarQuality. You can view the results of these verifications and the log entries created when modules are started or stopped.

To access the Event Server list:

From Settings select Servers > Server Event; The server events list is displayed.

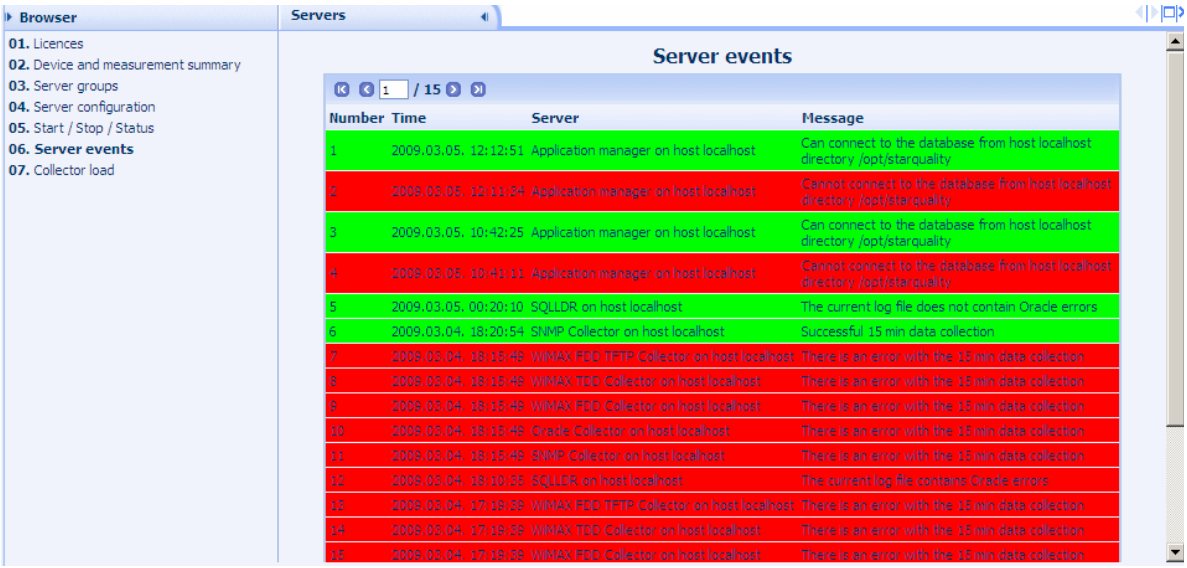

Browser
01. Licences
02. Device and measurement summary
03. Server groups
04. Server configuration
05. Start / Stop / Status
06. Server events
07. Collector load
Servers
Server events
1 / 15
Number Time Server Message
1 2009.03.05. 12:12:51 Application manager on host localhost Can connect to the database from host localhost directory /opt/starquality
2 2009.03.05. 12:11:34 Application manager on host localhost Cannot connect to the database from host localhost directory /opt/starquality
3 2009.03.05. 10:42:25 Application manager on host localhost Can connect to the database from host localhost directory /opt/starquality
4 2009.03.05. 10:41:11 Application manager on host localhost Cannot connect to the database from host localhost directory /opt/starquality
5 2009.03.05. 00:20:10 SQLLDR on host localhost The current log file does not contain Oracle errors
6 2009.03.04. 18:20:54 SNMP Collector on host localhost Successful 15 min data collection
7 2009.03.04. 18:15:49 WiMAX FDD TFTP Collector on host localhost There is an error with the 15 min data collection
8 2009.03.04. 18:15:49 WiMAX TDD Collector on host localhost There is an error with the 15 min data collection
9 2009.03.04. 18:15:49 WiMAX FDD Collector on host localhost There is an error with the 15 min data collection
10 2009.03.04. 18:15:49 Oracle Collector on host localhost There is an error with the 15 min data collection
11 2009.03.04. 18:15:49 SNMP Collector on host localhost There is an error with the 15 min data collection
12 2009.03.04. 18:10:35 SQLLDR on host localhost The current log file contains Oracle errors
13 2009.03.04. 17:19:39 WiMAX FDD TFTP Collector on host localhost There is an error with the 15 min data collection
14 2009.03.04. 17:19:39 WiMAX TDD Collector on host localhost There is an error with the 15 min data collection
15 2009.03.04. 17:19:39 WiMAX FDD Collector on host localhost There is an error with the 15 min data collection

Figure 9-33: Server Events Window

9.5.7 Viewing Collector Load Information

This feature is available for the admin and administrator users only. You can view results for all possible measurement times, and the list of measurements that were unsuccessful at a given time.

To use the Collector Load Information:

1 From Settings select Servers > Collector Load; The list of measurement servers is displayed, with the following information:

- General information: name, type, status and group
- Size of the data files created by the server
- Total number of equipments connected
- Total number of measurements performed. The maximum number of measurements for a single collector is 370,000.
- F H C A - identifies the type of the measurement: F for traffic, H for error, C Deprecated and A for Alvarion measurements.

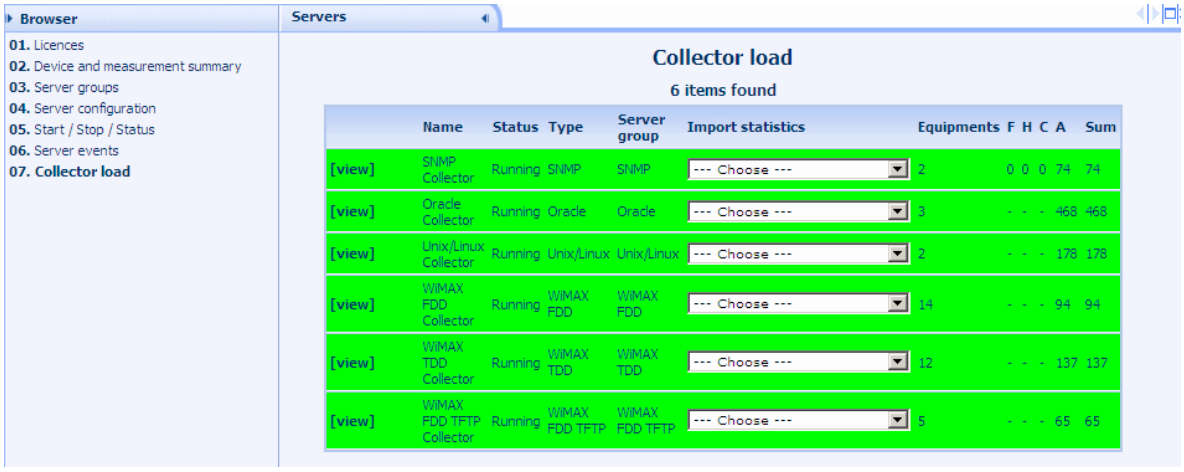

Browser
01. Licences
02. Device and measurement summary
03. Server groups
04. Server configuration
05. Start / Stop / Status
06. Server events
07. Collector load
Servers
Collector load
6 items found
Name Status Type Server group Import statistics Equipments F H C A Sum
[view] SNMP Collector Running SNMP SNMP --- Choose --- 2 0 0 0 74 74
[view] Oracle Collector Running Oracle Oracle --- Choose --- 3 - - - 468 468
[view] Unix/Linux Collector Running Unix/Linux Unix/Linux --- Choose --- 2 - - - 178 178
[view] WiMAX FDD Collector Running WiMAX FDD WiMAX FDD --- Choose --- 14 - - - 94 94
[view] WiMAX TDD Collector Running WiMAX TDD WiMAX TDD --- Choose --- 12 - - - 137 137
[view] WiMAX FDD TFTP Collector Running WiMAX FDD TFTP WiMAX FDD TFTP --- Choose --- 5 - - - 65 65

Figure 9-34: Collector Load

2 Use the scroll down menu in the Import Statistics column to display results for all possible measurement times, independently from the fact whether a measurement of that interval currently belongs to the given measurement server or not (since the query examines data collected earlier, too). As a hint the current time interval is indicated in green, with the number of measurements running with that interval.

If you select a different interval, the Statistics page is automatically displayed.

3 Click the **[view]** link in the first column; A page identical to the one displayed from Settings > Measurements > Summary is displayed, filtered by the selected measurement server.

Browser
01. Licences
02. Device and measurement summary
03. Server groups
04. Server configuration
05. Start / Stop / Status
06. Server events
07. Collector load
Servers
Summary table for all equipments
Site name Equipment name IP address F H C A Sum
[view] SERVER HEALTH A* 172.30.105.210 172.30.105.210:16162 37 37
[view] SERVER HEALTH A*2 172.30.105.210:16162 37 37
Summary: Number of equipments: 2 Number of measurements: 0 0 0 74 74
Number of measurements per minute: 0 0 0 4 4

Figure 9-35: Collector Load Statistics

4 You can view the list of measurements that were unsuccessful at a given time by clicking on the **[view]** link: The list of devices and measurements are displayed together with another link that opens to the configuration panel of the device.

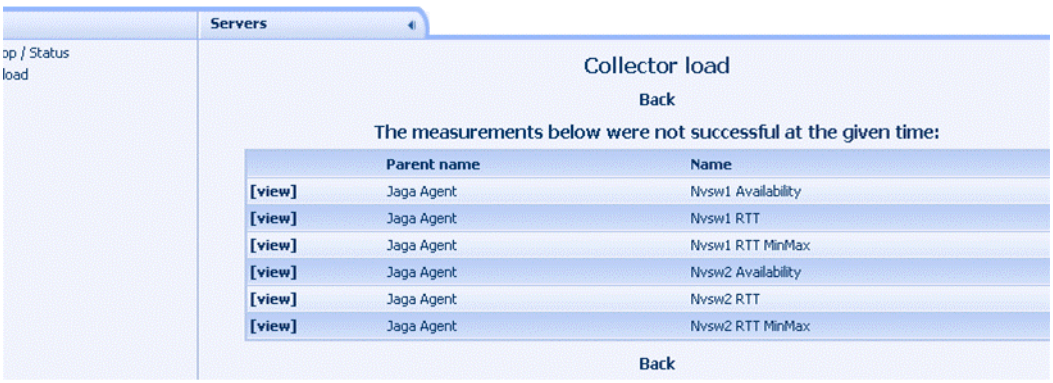


Figure 9-36: Missing Measurements at a Given Time

Chapter 10 - Northbound Interface (NBI)

In this chapter

- "Introduction" on page 269
- "Configuring SMTP Connection" on page 270
- "e-mail and SNMP Notifications" on page 271
- "SOAP Interface" on page 272

10.1 Introduction

The StarQuality Northbound Interface (NBI) functionality provides the following capabilities:

- Sending e-mail notifications to any number of recipients regarding server management events
- Sending e-mail notifications to any number of mail recipients regarding threshold crossing events:
  - » Sending SNMP traps to upper level management system (OSS)
  - » Forwarding reports defined in the system on a recurring basis
- Performing operations using the SOAP interface.

10.2 Configuring SMTP Connection

The StarQuality server can be configured to send e-mail notifications to a list of recipients about various events occurring within the system. For example: server up/down, collection failure.

10.2.1 Prerequisites

- An SMTP server is available on the operator network
- The server is accessible from the StarQuality machine on port 25
- Authorization credentials (user/pwd) for the SMTP server (if required)

10.2.2 Configuration

In the file */opt/starquality/etc/CONFIG_INI.pm*, edit the following parameters and restart StarQuality.

Table 10-1: Configuring SMTP Connection

Parameter	Edit
`$SMTP_SERVER='localhost';`	Replace localhost with the IP of the SMTP server
`$ADMIN_EMAIL_ADDRESSES='';`	Enter an e-mail address only if admin notifications are required, otherwise leave as is. Any number of e-mail addresses can be defined, separated by commas.
`$PVSR_EMAIL_ADDRESS='StarQuality';`	This is the e-mail address used as the sender for all outgoing e-mail messages. If the specified value does not contain the @ sign, use the <specified value>@<hostname>. When specifying the value make sure the sender is acceptable by the SMTP server. Example of a sender setting: StarQuality@alvarion.com
`#$SMTP_AUTH='user/pwd';`	If user/pwd are required by the SMTP server, the line should be uncommented (by removing the hash sign heading it) and replacing the values with actual ones

10.3 e-mail and SNMP Notifications

10.3.1 e-mail Notifications and Traps of Threshold Crossing Events

For any active threshold to which there are e-mail and/or SNMP recipients defined, the following occurs upon violation of the threshold:

- e-mail recipients:
  - » If the specific e-mail recipient is defined for "bulk threshold e-mail sending", StarQuality will aggregate the full list of violations for the given interval into a single e-mail message.
  - » If the specific e-mail recipient is not defined for bulk threshold sending, a separate e-mail message will be sent for each violation
- SNMP recipients - An SNMP notification will be sent per each violation instance to each of the SNMP recipients specified in the threshold.

10.3.2 Scheduled Reports

Scheduled Reports are sent in e-mail messages to the defined recipients according to the defined recurrence. For more information, see "Scheduling Report Delivery" on page 219.

10.3.3 Admin Messages

Notifications will be sent as e-mail messages to the defined recipients regarding the following server events:

- Collectors on/off
- Database usage issues
- Errors in collector operation

10.4 SOAP Interface

StarQuality SOAP interface enables various NBI operations via third party applications.

A prerequisite for enabling SOAP operations is activation of the StarQuality SOAP server.

For description and instructions on available operations, refer to the *StarQuality SOAP Manual.*

Chapter 11 - Device Specific Information

In this chapter:

- "Introduction" on page 274
- "Saving Performance Collection Files" on page 275
- "BreezeMAX FDD and TDD Equipment" on page 276
- "BreezeACCESS VL" on page 283
- "4Motion" on page 293
- "BreezeMAX Extreme" on page 317

11.1 Introduction

This chapter provides device specific information regarding software compatibility and limitations, traffic and performance KPIs, codes for thresholds and default built-in reports. This information may help you focus on the details required for each equipment type when using StarQuality.

KPIs (Key Performance Indicators) exist for three types of entities:

- Slot (also referred to as AU, sector, BS)
- SU (also referred to as MS, CPE)
- NPU (also referred to as BTS, in “common measurements”)

11.2 Saving Performance Collection Files

WiMAX devices generate performance collection files in cycles of 15 minutes. You can set up StarQuality to keep the performance collection files.

To set up performance collection files saving:

1. Go to */opt/starquality/etc/* and open the *CONFIG_INI.pm* file.
2. Set the `$WIMAX_KEEP_XML_FILES` parameter to 1 to enable performance files or to 0 to disable them (default).
3. Save the *CONFIG_INI.pm* file.
4. Restart all the collectors.

Each XML performance collection file is kept in the */opt/starquality/tmp/xml_archive* directory.

11.3 BreezeMAX FDD and TDD Equipment

11.3.1 Overview

- The information in this section is common to the following equipment types:
  - BreezeMAX FDD SNMP
  - BreezeMAX FDD
  - BreezeMAX TDD
- SW Compatibility:
  - FDD - 3.5/3.6 (SNMP based collection)
  - FDD 3.7/3.8
  - TDD - 4.5/4.6

  Refer to the Release Notes for specific Firmware versions.
- Collector type
  - FDD 3.5/3.6 - WiMAX FDD SNMP
  - FDD 3.7/3.8 - WiMAX FDD TFTP
  - TDD - WiMAX TDD

11.3.2 Network Discovery Prerequisites

Table 11-1: BTS Configuration Requirements

Requirement	FDD SNMP	FDD TFTP	TDD
Collection Interval Setting (rbCollectionStatisticsInterval)	900 sec.		
StarQuality registered as Authorised Manager (Traps disabled)	+	+	+
PM/TM Collection Activated		+	+ (Mode: Basic

11.3.3 Key Performance Indicators (KPIs)

11.3.3.1 BS KPIs

Each of the following is available for both Downlink (DL) and Uplink (UL):

Table 11-2: FDD and TDD Traffic BS KPIs

KPI	Code for Threshold and API			Description
	FDD SNMP	FDD TFTP	TDD	
Air Link Utilization (%)	#WOCC	#FOCC	#TOCC	The utilization of available wireless link resources: Total used symbols during the collection period as a percentage of total symbols available. $\text{Air Link Utilization\%} = 100 \times \frac{\text{Total symbols Qty used}}{\text{Total symbols available}}$
Subscription (%)	#WMP	#FMP	#TMP	The throughput (based on the total traffic rate taking into account the unusable gap period in each frame) as a percentage of total provisioned MIR. The higher this value, the higher is the actual utilization by users of the provisioned MIR. Subscription (%) = ■ If Constant throughput >0 then $100 \times \frac{Throughput - Const\ throughput}{\Sigma(CIR\&MIR)}$ ■ Otherwise $100 \times \frac{Throughput}{\Sigma(CIR\&MIR)}$ $Constant\ throuput = Throuput - \Sigma(CIR\&MIR)$
MIR+CIR Allocated (bits per second)	#WPM	#FPM	#TPM	The total Maximum Information Rate (MIR for all BE and NRT services and CIR for RT and CG services) provisioned to connected SUs.

Table 11-2: FDD and TDD Traffic BS KPIs (Continued)

KPI	Code for Threshold and API			Description
	FDD SNMP	FDD TFTP	TDD	
				$\Sigma MIRCIR = \sum_{Start\_time\_quarter}^{Stop\_time\_quarter} \times 1000 \times \frac{\text{Provisioned MIR for BE and nRT registered + Provisioned CIR for RT \& CG registered}}{\frac{Stop\_time - Start\_time}{15min}[bps]}$
CIR Allocated (bits per second)	#WPC	#FPC	#TPC	The Committed Information Rate (CIR for NRT, RT and CG services) provisioned to SUs connected to the AU/FDD Micro Base Station. $\Sigma CIR = \sum_{Start\_time\_quarter}^{Stop\_time\_quarter} \times 1000 \times \frac{\text{Provisioned CIR for nRT and CG registered}}{\frac{Stop\_time - Start\_time}{15min}[bps]}$
Throughput (bits per second)	#WT	#FT	#TT	Total symbols used. $\Sigma Rate = \text{Throughput} = \frac{\text{Total symbols used in bytes considering rate} \times 8}{\frac{Stop\_time - Start\_time}{15min} \times (\text{Total symbols available} \times \text{T\_symbol})[bps]}$

Table 11-2: FDD and TDD Traffic BS KPIs (Continued)

KPI	Code for Threshold and API			Description
	FDD SNMP	FDD TFTP	TDD	
Total Used Capacity Rate (bps):				Throughput of each MCS for the uplink and downlink directions Calculation formula per each rate: $\sum_{\text{Start\_time\_quarter}}^{\text{Stop\_time\_quarter}} \frac{(\text{Symbols[Ra]} \times b) \times 8}{\text{Total symbols available} \times \text{T\_symbol [bps]}}$ When: a - modulation rate b - bytes per symbol for this modulation rate
Total Used Capacity Rate 1 (BPSK 1/2)	#WCR1	#FCR1	#TCR1	
Total Used Capacity Rate 2 (BPSK 3/4)	#WCR2	#FCR2	N/A	
Total Used Capacity Rate 3 (QPSK 1/2)	#WCR3	#FCR3	#TCR3	
Total Used Capacity Rate 4 (QPSK 3/4)	#WCR4	#FCR4	#TCR4	
Total Used Capacity Rate 5 (16QAM 1/2)	#WCR5	#FCR5	#TCR5	
Total Used Capacity Rate 6 (16QAM 3/4)	#WCR6	#FCR6	#TCR6	
Total Used Capacity Rate 7 (64QAM 2/3)	#WCR7	#FCR7	#TCR7	
Total Used Capacity Rate 8 (64QAM 3/4)	#WCR8	#FCR8	#TCR8	
Number of connected SUs	#WCS	#FCS	#TCS	SUs with active services
Uptime	#WUPT	#FUPT	#TUPT	BTS uptime in seconds

11.3.3.2 SU KPIs

Performance KPIs include the uplink/downlink RSSI (Received Signal Strength Indicator), SNR (Signal to Noise Ration) and modulation rate (from rate 1 (BPSK 1/2] to rate 8 [64QAM 3/4]) measurements for all SUs.

Note the following regarding FDD ver3.5/3.6 SUs (SNMP based data collection):

- The number of SUs is limited to 10 per BTS
- Only a single value per each KPI is displayed according to its value at the time of sampling.

Table 11-3: FDD/TDD SU Performance KPIs (File Collection)

KPI	Code for Threshold and API			Description
	FDD (SNMP)	FDD TFTP	TDD	
Uplink RSSI min., max., average (dBm/tone)	The value or "Avg:": #WSU2	■ Min: #FSU1 ■ Max: #FSU2 ■ Avg.: #FSU3	All: #TSU4	The average/maximum/minimum RSSI value of the signal from the SU measured at the AU/FDD Micro Base Station for the past 15 minutes. In TDD there is only Average.
Downlink RSSI min., max., average (dBm/tone)				The average/maximum/minimum RSSI value of the signal from the AU measured at the SU (and reported over the air to the Base Station equipment) for the past 15 minutes. In TDD there is only Average.
Uplink SNR min., max., average (dB)	All: #WSU1	■ Min.: #FSU4 ■ Max.: #FSU5 ■ Avg.: #FSU6	■ Min.: #TSU1 ■ Max.: #TSU2 ■ Avg.: #TSU3	The average/maximum/minimum SNR value of the signal from the SU measured at the AU/FDD Micro Base Station for the past 15 minutes.
Downlink SNR min., max., average (dB)				The Average/maximum/minimum SNR value of the signal from the AU measured at the SU (and reported over the air to the Base Station equipment) for the past 15 minutes.
Uplink Rate min., max., average	All: #WSU3	■ Min.: #FSU7 ■ Max.: #FSU8 ■ Avg.: #FSU9	■ Min.: #TSU5 ■ Max.: #TSU6 ■ Avg.: #TSU7	From rate 1 (BPSK 1/2) to rate 8 (64QAM 3/4)
Downlink Rate min., max., average				From rate 1 (BPSK 1/2) to rate 8 (64QAM 3/4)
SU Acknowledged Bytes (bytes)	N/A	#FSUc (Ver.3.8 only	N/A	
SU CRC Errors (count)	N/A	#FSUj (Ver.3.8 only	N/A	
SU Discard Bytes in ARQ (bytes)	N/A	#FSUg (Ver.3.8 only	N/A	
SU Drop Bytes (bytes)	N/A	#FSUe (Ver.3.8 only	N/A	
SU Drop Ratio w ARQ (%)	N/A	#FSUk (Ver.3.8 only	N/A	
SU Drop Ratio w/o ARQ (%)	N/A	#FSUl (Ver.3.8 only	N/A	
SU Duplicate Discard Bytes (bytes)	N/A	#FSUf (Ver.3.8 only	N/A	

Table 11-3: FDD/TDD SU Performance KPIs (File Collection)

KPI	Code for Threshold and API			Description
	FDD (SNMP)	FDD TFTP	TDD	
SU Throughput (Bits per Second)	N/A	#FSUa (Ver.3.8 only	N/A	
SU Total Discard Bytes (bytes)	N/A	#FSUh (Ver.3.8 only	N/A	
SU Transferred Bytes (bytes)	N/A	#FSUb (Ver.3.8 only	N/A	

11.3.3.3 Common/BTS KPIs

Uptime

11.3.4 Default Built-in Reports

- BottomN Uptime
- TopN Air Link Utilization
- TopN Throughput
- TopN Number of Connected SUs

11.4 BreezeACCESS VL

11.4.1 Overview

SW Compatibility: Version 6.0. (Up to 10 SUs per BTS can be measured)

Collector type - WiMAX VL

11.4.2 Network Discovery Prerequisites

- StarQuality registered as Authorised Manager (Traps disabled)
- PM/TM Collection Activated

11.4.3 Key Performance Indicators (KPIs)

11.4.3.1 BS KPIs

Table 11-4: BreezeACCESS VL Traffic KPIs

KPI	Measurement Name for Reports	Code for Threshold and API	Description
Concatenated Frames Received (frames per second)	Concatenated Frames Single Concatenated Frames Double Concatenated Frames More Concatenated Frames Total	#VCFS #VCFD #VCFM #VCFT	The total number of concatenated frames received from the wireless medium, including duplicate frames. There are also separate counts for concatenated frames that include one frame (Single), two frames (Double) or more than two frames (More).
Concatenated Frames Transmitted (frames per second)			The total number of concatenated frames transmitted successfully to the wireless medium, excluding retransmissions. There are also separate counts for concatenated frames that include one frame (Single), two frames (Double) or more than two frames (More).

Table 11-4: BreezeACCESS VL Traffic KPIs (Continued)

KPI	Measurement Name for Reports	Code for Threshold and API	Description
Errors Received (frames per second)	Errors Receive CRC Errors Receive Decrypt Errors Receive Duplicate frames discarded Errors Receive Other Errors Receive Overrun Errors Receive Phy	#VERC #VERD #VERd #VERo #VERO #VERP	■ Phy - The number of Physical errors (unidentified signals). ■ CRC - The number of frames received from the wireless medium containing CRC errors. ■ Overrun - The number of frames that were discarded because the receive rate exceeded the processing capability or the capacity of the Ethernet port. ■ Decrypt - The number of frames that were not received properly due to a problem in the data decryption mechanism. ■ Other - Errors other than previous KPIs. ■ Duplicate Frames Discarded - The number of data frames discarded because multiple copies were received. If an acknowledgement message is not received by the originating unit, the same data frame can be received more than once. Although duplicate frames are included in all KPIs that include data frames, only the first copy is forwarded to the Ethernet port.

Table 11-4: BreezeACCESS VL Traffic KPIs (Continued)

KPI	Measurement Name for Reports	Code for Threshold and API	Description
Errors Transmitted (frames per second)	Errors Transmit Frames dropped (too many retries) Errors Transmit Internally discarded MIR/CIR Errors Transmit Other TX Events Errors Transmit Underrun Events	#VETD #VETI #VETO #VETU	■ Frames dropped (too many retries) - The number of dropped frames, which are unsuccessfully retransmitted without being acknowledged until the maximum permitted number of retransmissions. ■ Underrun Events - The number of times that transmission of a frame was aborted because the rate of submitting frames for transmission exceeds the available transmission capability. ■ Other TX Events - The number of frames whose transmission was not completed or delayed due to a problem other than those represented by the other KPIs. ■ Internally discarded MIR/CIR - The number of data frames received from the Ethernet port that were discarded by the MIR/CIR mechanism to avoid exceeding the maximum permitted information rate.
Frames Received (frames per second)	Frames Received - Total	#VFRT	The total number of data frames received from the wireless medium, including duplicate frames.

Table 11-4: BreezeACCESS VL Traffic KPIs (Continued)

KPI	Measurement Name for Reports	Code for Threshold and API	Description
Frames Transmitted (frames per second)	Frames Submitted High Frames Submitted Low Frames Submitted Mid Frames Submitted Total	#VFSH #VFSL #VFSM #VFST	The total number of data frames submitted to the internal bridge for transmission to the wireless medium. The count does not include control and wireless management frames, or retransmissions. There are also separate counts for each priority queue through which the frames were routed (High, Mid and Low).
Wireless Frames Received (frames per second)	Wireless Frames Received	#VWFR	The total number of frames received from the wireless medium. The count includes data frames as well as control and wireless management frames. The count does not include bad frames and duplicate frames.
Wireless Frames Transmitted (frames per second)	Wireless Frames Submitted Beacons Wireless Frames Submitted OtherMng and Data Wireless Frames Submitted Total	#VWFB #VWFO #VWFT	The number of frames transmitted to the wireless medium. The total includes one count for each successfully transmitted unicast frame (excluding retransmissions), and the number of transmitted multicast and broadcast frames, including control and wireless management frames.
CIR Allocated (Bits per second)	CIR Allocated	#VCA	The sum of allocated CIR (Committed Information Rate) Downlink/Uplink values for all the SUs in the sector.
Ethernet Throughput (bits per second)	Ethernet Throughput	#VETH	The average throughput per second on the Ethernet port on Downlink/Uplink direction.

Table 11-4: BreezeACCESS VL Traffic KPIs (Continued)

KPI	Measurement Name for Reports	Code for Threshold and API	Description
MIR Allocated (bits per second)	MIR Allocated	#VMA	The sum of allocated MIR (Maximum Information Rate) Downlink/Uplink values for all the SUs in the sector.
Noise Floor (dBm)	Noise Floor	#VNF	The average Noise Floor recorded by the unit.
Number of Connected SUs	Number Of Connected SUs	#VCS	SUs with active services
Retransmission (%)	Retransmission	#VR	The percentage of total number of retransmissions, including all unsuccessful transmissions and retransmissions, out of the total number of unicast frames transmitted over the wireless port.
Throughput (bits per second)	Throughput	#VTHR	The average throughput per second on the Radio port on Downlink/Uplink direction.
Uptime (hours)	Uptime	#VUPT	BS uptime in hours
RSSI	RSSI	#VRSS	

11.4.3.2 SU KPIs

Table 11-5: BreezeACCESS VL SU Performance KPIs

KPI	Measurement Name for Reports	Code for Threshold and API	Description
Concatenated Frames, Receive (frames per second)	Concatenated Frames Single Concatenated Frames Double Concatenated Frames More Concatenated Frames Total	#VCFS #VCFD #VCFM #VCFT	The total number of concatenated frames received from the wireless medium, including duplicate frames. There are also separate counts for concatenated frames that include one frame (Single), two frames (Double) or more than two frames (More).
Concatenated Frames, Transmit (frames per second)			The total number of concatenated frames transmitted successfully to the wireless medium, excluding retransmissions. There are also separate counts for concatenated frames that include one frame (Single), two frames (Double) or more than two frames (More).

Table 11-5: BreezeACCESS VL SU Performance KPIs (Continued)

KPI	Measurement Name for Reports	Code for Threshold and API	Description
Errors Received (frames per second)	Errors Receive CRC Errors Receive Decrypt Errors Receive Duplicate frames discarded Errors Receive Other Errors Receive Overrun Errors Receive Phy	#VERC #VERD #VERd #VERo #VERO #VERP	■ Phy - The number of Physical errors (unidentified signals). ■ CRC - The number of frames received from the wireless medium containing CRC errors. ■ Overrun - The number of frames that were discarded because the receive rate exceeded the processing capability or the capacity of the Ethernet port. ■ Decrypt - The number of frames that were not received properly due to a problem in the data decryption mechanism. ■ Other - Receive errors other than previous KPIs. ■ Duplicate frames discarded -The number of data frames discarded because multiple copies were received. If an acknowledgement message is not received by the originating unit, the same data frame can be received more than once. Although duplicate frames are included in all KPIs that include data frames, only the first copy is forwarded to the Ethernet port.

Table 11-5: BreezeACCESS VL SU Performance KPIs (Continued)

KPI	Measurement Name for Reports	Code for Threshold and API	Description
Errors Transmitted (frames per second)	Errors Transmit Frames dropped (too many retries) Errors Transmit Internally discarded MIR/CIR Errors Transmit Other TX Events Errors Transmit Underrun Events	#VETD #VETI #VETO #VETU	■ Frames dropped (too many retries) - The number of dropped frames, which are unsuccessfully retransmitted without being acknowledged until the maximum permitted number of retransmissions. ■ Underrun Events - The number of times that transmission of a frame was aborted because the rate of submitting frames for transmission exceeds the available transmission capability. ■ Other TX Events - The number of frames whose transmission was not completed or delayed due to a problem other than those represented by the other KPIs. ■ Internally discarded MIR/CIR - The number of data frames received from the Ethernet port that were discarded by the MIR/CIR mechanism to avoid exceeding the maximum permitted information rate.
Ethernet Throughput (bits per second)	Ethernet Throughput	#VETH	The average throughput per second on the Ethernet port on Downlink/Uplink direction.
Frames Received (frames per second)	Frames Received - Total	#VFRT	The total number of data frames received from the wireless medium, including duplicate frames.
Frames Submitted (frames per second)	Frames Submitted High Frames Submitted Low Frames Submitted Mid Frames Submitted Total	#VFSH #VFSL #VFSM #VFST	The total number of data frames submitted to the internal bridge for transmission to the wireless medium. The count does not include control and wireless management frames, or retransmissions. There are also separate counts for each priority queue through which the frames were routed (High, Mid and Low).

Table 11-5: BreezeACCESS VL SU Performance KPIs (Continued)

KPI	Measurement Name for Reports	Code for Threshold and API	Description
Noise Floor (dBm)	Noise Floor	#VNF	The average Noise Floor recorded by the unit.
Retransmission (%)	Retransmission	#VRSU	The percentage of total number of retransmissions, including all unsuccessful transmissions and retransmissions, out of the total number of unicast frames transmitted over the wireless port.
Downlink RSSI (dBm)	RSSI	#VRSS	Downlink RSSI value as measured in the time of sampling
Downlink SNR (dB)	SNR	#VSNR	Downlink SNR value as measured at the time of sampling
Throughput (bits per second)	Throughput	#VTHR	Sector throughput as measured at the time of sampling
Uptime (hours)	Uptime	#VUPT	CPE uptime in hours
Wireless Frames (frames per second)	Wireless Frames	#VWF	The number of frames transmitted to the wireless medium. The total includes one count for each successfully transmitted unicast frame (excluding retransmissions), and the number of transmitted multicast and broadcast frames, including control and wireless management frames.

11.4.4 Default Built-in Reports

- BottomN Uptime
- TopN Throughput
- TopN Number of Connected SUs

11.5 4Motion

11.5.1 Network Discovery Prerequisites

- PM/TM Collection Contents - All Management > Performance Categories selected
- For MS data - select "All MS Basic Data" (it is not selected by default)

11.5.2 General Settings

11.5.2.1 Setting the Delay Parameter on 4Motion Base Stations

On 4Motion base stations, the Delay parameter establishes a time span between the moment a cycle ends, and the time it can be imported into StarQuality instead of the previous cycle's file. For example, if the delay is set to 2 minutes, the cycle that ended at 16:15 is read for StarQuality at 16:17. Until then, StarQuality only reads the 16:00 cycle. The purpose of this setting is to compensate for any delays the device may have in building the performance collection file. All the time values are in reference to the equipment's time.

You can set both a generic delay for all the equipments and specific delays for individual devices if you wish to override the generic delay.

To set a generic delay parameter:

1. Go to */opt/starquality/etc/* and open the *CONFIG_INI.pm* file.
2. Set the `$WIMAX_4Motion_DELAY` parameter to the desired delay duration expressed in seconds. In the example above, the 2 minutes delay is set as:

   ```
   $WIMAX_4Motion_DELAY=120
   ```

   By default, the `$WIMAX_4Motion_DELAY` parameter is set to `0` (no delay).

To set the delay parameter for a specific device:

1. Go to **Settings** > **Site and equipment configuration**
2. Click the site icon to enter the site.
3. Click **edit** next to the equipment you wish to configure.
4. Fill in the **Delay (sec)** parameter with the desired value.
5. Click **OK**.

11.5.2.2 Setting the Timeout and Retry Parameters for *4*Motion TFTP

For 4Motion TFTP devices, you may set generic timeout and retry parameters for importing the performance collection files. The Retry parameter indicates for how many times StarQuality reattempts to import the file in case of failure after the initial attempt (a value of 3 means 1 try and maximum 3 retries for a maximum total of 4 attempts). The Timeout parameter indicates for how many seconds to wait between consecutive retries. These parameters are set in the *CONFIG_INI.pm* file:

- `$WIMAX_4Motion_TFTP_INTERVAL` - Timeout interval in seconds. The default value is 80.
- `$WIMAX_4Motion_TFTP_RETRY` - Number of retries. The default value is 3.

The parameters above are generic. If you set different timeout and retries values for specific base stations, from their corresponding edit screens, these values override the settings in the *CONFIG_INI.pm* file.

11.5.3 *4*Motion Version Management

StarQuality may be configured to support specific 4Motion versions (2.5, 3.0, 3.0M and 3.5). Each version is enabled/disabled in StarQuality based on a parameter stored in the *CONFIG_INI.pm* file in */opt/starquality/etc/*. The following parameters apply:

- `$WIMAX_KEEP_XML_FILES=1;`
- `$WIMAX_16E_VERSIONS{25}=1;` For 4Motion 2.5, default value 1

- `$WIMAX_16E_VERSIONS{30}=0;` For 4Motion 3.0, default value 0
- `$WIMAX_16E_VERSIONS{3010}=1;` For 4Motion 3.0M, default value 0
- `$WIMAX_16E_VERSIONS{35}=1;` For 4Motion 3.5, default value 0
- `$WIMAX_16E_VERSIONS{3030}=0;`
- `$WIMAX_16E_VERSIONS{31}=0;`

NOTE!

Follow the steps below in their exact order. For all the charts and measurements to display properly, you must enable the corresponding software version in StarQuality before the unit is discovered.

To setup the desired 4Motion versions:

1. Stop every 4Motion collector.
2. Go to */opt/starquality/etc/* and open the *CONFIG_INI.pm* file. In the *CONFIG_INI.pm* file, set the corresponding `$WIMAX_4Motion_VERSIONS` parameters to 1 for enabling the version or to 0 for disabling it. For instance, to enable versions 2.5 and 3.0M and disable versions 3.0 and 3.5, the following values apply:

```
$WIMAX_16E_VERSIONS{25}=1
$WIMAX_16E_VERSIONS{30}=0
$WIMAX_16E_VERSIONS{3010}=1
$WIMAX_16E_VERSIONS{35}=0;
```

3. Go to */opt/starquality/bin* and run the *drop_wimax_4Motion_charts.pl* script file:

```
cd /opt/starquality/bin
./drop_wimax_4Motion_charts.pl
```

INFORMATION

If you are running StarQuality on Solaris, it must be run as `starq` user (`#su - starq`)

4 Start the 4Motion collectors.

INFORMATION

Only 4Motion version 2.5 is enabled by default in StarQuality. You must enable SW versions 3.0, 3.0M and 3.5 manually using the procedure described above. If a device is going to be upgraded, you must enable the new version in StarQuality first. Always check the 4Motion versions enabled in StarQuality before upgrading a 4Motion device.

11.5.3.1 4Motion Version Compatibility

This StarQuality version supports the 4Motion versions 2.5M, 3.0, 3.0M, 3.1 and 3.5.

The 4Motion NPU firmware versions supported for all BTS types (Macro Indoor, Macro Outdoor and Micro Outdoor) are: 2.5.212.7 (2.5M1), 3.0.5.14 to 3.0.5.16 (3.0), 3.0.10.3 (3.0M), and 3.5.

Refer to the release notes for details about each version.

The Collector type is WiMAX 4Motion

Default Built-in Reports:

- BottomN Uptime
- TopN Air Link Utilization
- TopN Average Sector Throughput
- TopN Number of Connected SUs

11.5.3.2 KPIs Per Firmware Version

The following table shows the 4Motion KPIs and their presence in each of the SW firmware versions (Y=Yes; N=No). Some of the KPIs have been changed throughout the versions. These changes are described in the Comments column.

Table 11-6: 4Motion KPIs Per Firmware Version

#	KPI Name in StarQuality			2.5M2	3.0	3.0M	3.5	Comments
BS KPIs								
1	MCS Distribution	Downlink		Y	Y	Y	Y	
		Uplink		Y	Y	Y	Y	
2	Uplink HARQ Packet Error Rate	Uplink		Y	Y	Y	Y	from 3.0M/3.5 name changed to UL Dropped HARQ sub-bursts
3	SINR Distribution	Downlink		Y	Y	Y	Y	
		Uplink		Y	Y	Y	Y	
4	Air Link Utilization			Y	Y	Y	Y	
5	MAP Size Distribution			Y	Y	Y	Y	
6	Retransmission Downlink			Y	Y	Y	Y	
7	Noise Floor Uplink			Y	Y	Y	Y	
8	Throughput			Y	Y	Y	Y	2.5 name was Average Sector Throughput
9	Average Backhaul Traffic			Y	N	N	N	
10	Active MS/Idle MS Registered MS			N	Y	Y	Y	
11	Active/idle MSs out of registered			N	N	Y	Y	
12	Active MS / Idle MS Ratio			N	Y	N	N	

Table 11-6: 4Motion KPIs Per Firmware Version (Continued)

#	KPI Name in StarQuality			2.5M2	3.0	3.0M	3.5	Comments
13	MS Registration			N	Y	Y	Y	
14	MS Registration Ratio			N	Y	Y	Y	
15	MS Registration –Service Flows			N	N	Y	Y	
16	BS Traffic Type			N	Y	N	Y	
17	Burst Error Rate	Downlink		N	Y	Y	Y	
		Uplink		N	Y	Y	Y	
18	Burst Error Rate Ratio	Downlink		N	Y	Y	Y	
		Uplink		N	Y	Y	Y	
19	MS Hand Over			N	Y	Y	Y	
20	MS Hand Over Ratio			N	Y	Y	Y	
21	Spectral Efficiency of all MS			Y	Y	Y	Y	from 3.0M/3.5 name changed to Spectral Efficiency
22	Average Provisioned	Downlink		N	Y	Y	Y	
		Uplink		N	Y	Y	Y	
23	MIR+CIR Provisioned			N	Y	N	N	
MS KPIs								
1	CINR	Downlink	Min	Y	N	Y	Y	from 3.0 name was changed to SINR
			Max	Y	N	Y	Y	
			Average	Y	Y	Y	Y	

Table 11-6: 4Motion KPIs Per Firmware Version (Continued)

#	KPI Name in StarQuality			2.5M2	3.0	3.0M	3.5	Comments
2	CINR	Uplink	Min	Y	N	Y	Y	from 3.0 name was changed to SINR
			Max	Y	N	Y	Y	
			Average	Y	Y	Y	Y	
3	Average Spectral Efficiency			Y	N	N	N	
4	MCS	Downlink		Y	Y	Y	Y	from 3.0M/3.5 name was changed to Spectral Efficiency Downlink
		Uplink		Y	Y	Y	Y	
5	RSSI	Downlink		N	N	Y	Y	
		Uplink		Y	Y	Y	Y	
6	Aggregated Throughput			N	Y	Y	Y	
7	Total Transferred Bursts			N	Y	N	N	
8	Throughput Ratio			N	Y	Y	Y	
9	MS Burst Error Rate	Downlink		N	Y	Y	Y	
		Uplink		N	Y	Y	Y	
10	MS Burst Error Rate Ratio	Downlink		N	Y	Y	Y	
		Uplink		N	Y	Y	Y	
Distributed ASNGW KPIs								
1	Average Backhaul Traffic			Y	Y	Y	Y	
2	R3 Throughput			N	Y	Y	Y	
3	R3 MIR Throughput Oversubscription			N	Y	Y	Y	

Table 11-6: 4Motion KPIs Per Firmware Version (Continued)

#	KPI Name in StarQuality			2.5M2	3.0	3.0M	3.5	Comments
4	R3 CIR Throughput Oversubscription			N	Y	Y	Y	
5	R6 Throughput			N	Y	Y	Y	
6	R6 Total MIR			N	Y	Y	Y	
7	R6 Total CIR			N	Y	Y	Y	
8	ASN GW - MS Registration			N	Y	Y	Y	
9	NE failure Ratio			N	Y	Y	Y	
10	Authentication Reject Ratio			N	Y	Y	Y	
11	Service Flow usage Ratio			N	Y	N	N	
12	R6 MIR Throughput Oversubscription			N	Y	N	N	
13	R6 CIR Throughput Oversubscription			N	Y	N	N	
14	R3 Total MIR			N	Y	N	N	
15	R3 Total CIR			N	Y	N	N	

11.5.4 4Motion BTS KPIs

The following table shows the 4Motion KPIs and their presence in each of the SW firmware versions (Y=Yes; N=No). Some of the KPIs have been changed throughout the versions. These changes are described in the Comments column.

INFORMATION

NPU KPIs: There are KPIs that are relevant only for NPUs working in non-transparent mode. You can find the items relevant for non-transparent mode in the release notes.

Table 11-7: 4Motion BTS KPIs

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
Active MS / Idle MS / Registered MS (count)	■ 3.0 ■ 3.0M ■ 3.5	Registered MSs Qty Idle MSs Qty Idle MSs Ratio Active MS Qty	#4019 (also #4NTl for ASN-GW) #4020 #4032 #4021	■ Idle: MSs which have been connected to the BS but have no actual traffic to transmit or receive, thus they are not occupying any sector resources. ■ Registered: all connected MSs to the sector (Active + Idle). ■ Active: MSs which are currently using and occupying sector resources. The MSs are sampled at the end of the 15 Min period.
Active/Idle MSs out of registered (%)	■ 3.0	Active MS Ratio	#4033	Ratio of values measured above

Table 11-7: 4Motion BTS KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
Air Link Utilization (%)	■ 2.5M2 ■ 3.0M ■ 3.5	Air Link Utilization ALL UL Air Link Utilization, Data Zone UL Air Link Utilization, Feedback Zone v2.5 DL Air Link Utilization, Data Zone DL Air Link Utilization, First Zone	#4UA #4UU1 #4UU2 #4UD1 #4UD2	The utilization of available wireless link resources: Data utilization from all slots (including MAP, not including preamble and TTG/RTG) per BS as a percentage of total slots available for the uplink and downlink directions.
	■ 3.0M ■ 3.5	DL Air Link Utilization, Reuse 3 Data Zone	#4UD3	
■ Average Provisioned Downlink (bits per second) ■ Average Provisioned Uplink (bits per second)	■ 3.0 ■ 3.0M ■ 3.5	Average Provisioned BE MIR Average Provisioned RT CIR Average Provisioned RT MIR Average Provisioned UGS CIR Average Provisioned eRT CIR Average Provisioned eRT MIR Average Provisioned nRT CIR Average Provisioned nRT MIR	#4041 #4037 #4038 #4034 #4035 #4036 #4039 #4040	Counts the provisioned DL/UL based on registered MSs per second. The graphs are per QoS. The calculation divides the accumulated value with 900 seconds.
BS Traffic Type (% Bursts)	3.0	DL BF Ratio DL CDD Ratio DL MIMO A Ratio DL MIMO B Ratio	#4009 #4008 #4006 #4007	

Table 11-7: 4Motion BTS KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
■ Burst Error Rate Downlink (count) ■ Burst Error Rate Uplink (count)	■ 3.0 ■ 3.0M ■ 3.5	Successful Transferred Bursts Qty Dropped Bursts Qty Retransmission	#4026 #4027 #4028	Counts the actual numbers of bursts in the sampled period
■ Burst Error Rate Ratio Downlink (%) ■ Burst Error Rate Ratio Uplink (%)	■ 3.0 ■ 3.0M ■ 3.5	Successful Transfer Ratio Drop Ratio Retransmission Ratio	#4011 #4012 #4013	Ratio is based on number of bursts counted in the sampled period
MAP Size Distribution (Frames)	■ 2.5M2 ■ 3.0 ■ 3.0M ■ 3.5	MAP Length Two Symbols MAP Length Four Symbols MAP Length Six Symbols MAP Length Eight Symbols MAP Length Ten Symbols MAP Length More Than Ten Symbols	#4MS1 #4MS2 #4MS3 #4MS4 #4MS5 #4MS6	Number of frames per number of symbols per BS for the downlink direction.

Table 11-7: 4Motion BTS KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
MCS Distribution Downlink (Bits per Second)	■ 2.5M2 ■ 3.0 ■ 3.0M ■ 3.5	MCS Distribution QPSK 1/2 Rep 6	#4D01	Throughput of each MCS for the downlink direction
		MCS Distribution QPSK 1/2 Rep 4	#4D02	
		MCS Distribution QPSK 1/2 Rep 2	#4D03	
		MCS Distribution QPSK 1/2	#4D04	
		MCS Distribution QPSK 3/4	#4D05	
		MCS Distribution 16QAM 1/2	#4D06	
		MCS Distribution 16QAM 3/4	#4D07	
		MCS Distribution 64QAM 1/2	#4D08	
		MCS Distribution 64QAM 2/3	#4D09	
		MCS Distribution 64QAM 3/4	#4D10	
		MCS Distribution 64QAM 5/6	#4D11	
MCS Distribution Downlink (Bits per Second) (cntd))	■ 3.0M ■ 3.5	MCS Distribution QPSK 1/2 MIMO B	#4D12	
		MCS Distribution QPSK 3/4 MIMO B	#4D13	
		MCS Distribution 16QAM 1/2 MIMO B	#4D14	
		MCS Distribution 16QAM 3/4 MIMO B	#4D15	
		MCS Distribution 64QAM 1/2 MIMO B	#4D16	
		MCS Distribution 64QAM 2/3 MIMO B	#4D17	
		MCS Distribution 64QAM 3/4 MIMO B	#4D18	
		MCS Distribution 64QAM 5/6 MIMO B	#4D19	

Table 11-7: 4Motion BTS KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
MCS Distribution Uplink (Bits per Second)	■ 2.5M2 ■ 3.0 ■ 3.0M ■ 3.5	MCS Distribution QPSK 1/2 Rep 6 MCS Distribution QPSK 1/2 Rep 4 MCS Distribution QPSK 1/2 Rep 2 MCS Distribution QPSK 1/2 MCS Distribution QPSK 3/4 MCS Distribution 16QAM 1/2 MCS Distribution 16QAM 3/4 MCS Distribution 64QAM 1/2 MCS Distribution 64QAM 2/3 MCS Distribution 64QAM 3/4 MCS Distribution 64QAM 5/6	#4D01 #4D02 #4D03 #4D04 #4D05 #4D06 #4D07 #4D08 #4D09 #4D10 #4D11	Throughput of each MCS for the uplink direction
MIR+CIR Provisioned (Bits per Second)	3.0	MIR+CIR Provisioned	#4MC	Maximum Information Rate + Committed Information Rate
MS Hand Over (Count)	■ 3.0 ■ 3.0M ■ 3.5	Successful Ho Attempts Failed Ho Attempts	#4029 #4030	Counts the number handover attempts both in and out
Hand Over Ratio (%)	■ 3.0 ■ 3.0M ■ 3.5	Successful Ho Attempts Ratio Ho Attempts Ratio Failed Ho Attempts Ratio	#4014 #4015 #4016	Ratio calculation of KPIs mentioned above

Table 11-7: 4Motion BTS KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
MS Registration (Count)	■ 3.0 ■ 3.0M ■ 3.5	Successful Initial NE Failed Initial NE	#4022 (also #4NTm for ASN-GW) #4023 (also #4NTn for ASN-GW)	Number of failed/successful initial network entry attempts
MS Registration - Service Flows (Count)	■ 3.0	Created Service Flows Qty	#4025 (also #4NTp for ASN-GW)	Number of created service flows during MS registration
MS Registration Ratio (%)	■ 3.0	Failed Initial NE Ratio Successful Initial NE Ratio Created Service Flows Qty Ratio	#4003 #4002 #4005	Ratio of KPIs mentioned above
	■ 3.0M ■ 3.5	Failed Initial NE Ratio Successful Initial NE Ratio	#4003 #4002	
Noise Floor Uplink (dBM/tone)	■ 2.5M2 ■ 3.0M ■ 3.5	UL Noise (99th Percentile) v2.5 UL Noise (Median)	#4UN1 #4UN2	The uplink noise determines sector UL capacity. In case of UL noise, the "far" MSs cannot reach the BS with the minimum power required by the BS receiver sensitivity, thus UL noise serves as UL RF resource.
Number Of Connected SUs	■ 2.5M2 ■ 3.0M and later	Number Of Connected SUs	#4CS	Number of SUs that have been connected to the BS, for the whole 15 minute interval proceeding the PMTM file generation.

Table 11-7: 4Motion BTS KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
Retransmission Downlink (HARQ Sub Bursts)	■ 2.5M2 ■ 3.0 ■ 3.0M ■ 3.5	DL Retransmission, Total DL Retransmission, Zero Retransmission DL Retransmission, One Retransmission DL Retransmission, Two Retransmissions DL Retransmission, Three Retransmissions DL Retransmission, Four Retransmissions DL Retransmission, Above Four Retransmissions	#4DR0 #4DR1 #4DR2 #4DR3 #4DR0 #4DR5 #4DR6	Number of transactions with a certain number of retransmissions per BS for the downlink direction.
Seen	N/A	Seen	#4SEE	For internal system use
SINR Distribution Downlink (%)	■ 2.5M2	DL SINR Distribution, SINR < 3dB DL SINR Distribution, 3dB < SINR < 9dB DL SINR Distribution, 11dB < SINR < 13dB DL SINR Distribution, 13dB < SINR < 17dB DL SINR Distribution, 17dB < SINR < 21dB DL SINR Distribution, 21dB < SINR < 25dB	#4SD1 #4SD2 #4SD3 #4SD4 #4SD5 #4SD6	Percentages of CPEs per SINR range for downlink per BS.

Table 11-7: 4Motion BTS KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
SINR Distribution Downlink (%) (cntd)	■ 3.0M ■ 3.5	DL SINR Distribution, SINR 13dB till 17dB	#4SD4	Percentages of CPEs per SINR range for downlink per BS.
		DL SINR Distribution, SINR 13dB till 17dB All	#4054	
		DL SINR Distribution, SINR 13dB till 17dB FFR Reuse 3	#4sd4	
		DL SINR Distribution, SINR 13dB till 17dB v2.5	#4d08	
		DL SINR Distribution, SINR 17dB till 21dB	#4SD5	
		DL SINR Distribution, SINR 17dB till 21dB All	#4055	
		DL SINR Distribution, SINR 17dB till 21dB FFR Reuse 3	#4sd5	
		DL SINR Distribution, SINR 17dB till 21dB v2.5	#4d09	
		DL SINR Distribution, SINR 3dB till 9dB v2.5	#4d06	
		DL SINR Distribution, SINR 3dB till 9dB	#4SD2	
		DL SINR Distribution, SINR 9dB till 13dB	#4SD3	
		DL SINR Distribution, SINR 9dB till 13dB All	#4053	
		DL SINR Distribution, SINR 9dB till 13dB FFR Reuse 3	#4sd3	
		DL SINR Distribution, SINR 9dB till 13dB v2.5	#4d07	
		DL SINR Distribution, SINR > 21dB	#4SD6	
		DL SINR Distribution, SINR > 21dB All	#4056	

Table 11-7: 4Motion BTS KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
SINR Distribution Uplink (%)	■ 2.5M2	UL SINR Distribution, SINR < 3dB	#4SU1	Percentages of CPEs per SINR range for Uplink per BS.
		UL SINR Distribution, 3dB < SINR < 7dB	#4SU2	
		UL SINR Distribution, 7dB < SINR < 11dB	#4SU3	
		UL SINR Distribution, 11dB < SINR < 15dB	#4SU4	
		UL SINR Distribution, 15dB < SINR < 19dB	#4SU5	
		UL SINR Distribution, SINR > 19dB	#4SU6	
	■ 3.0 ■ 3.0M ■ 3.5	UL SINR Distribution, SINR 11dB till 15dB	#4SI4	
		UL SINR Distribution, SINR 11dB till 15dB v2.5	#4d14	
		UL SINR Distribution, SINR 15dB till 19dB	#4SI5	
		UL SINR Distribution, SINR 15dB till 19dB v2.5	#4d15	
		UL SINR Distribution, SINR 3dB till 7dB v2.5	#4d12	
		UL SINR Distribution, SINR 5dB till 9dB	#4SI2	
		UL SINR Distribution, SINR 7dB till 11dB v2.5	#4d13	
		UL SINR Distribution, SINR 9dB till 11dB	#4SI3	
		UL SINR Distribution, SINR > 19dB	#4SI6	
		UL SINR Distribution, SINR > 19dB v2.5	#4d16	
		UL SINR Distribution, SINR Below 3dB v2.5	#4d11	
		UL SINR Distribution, SINR less than 5dB	#4SI1	

Table 11-7: 4Motion BTS KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
Spectral Efficiency (Bits/Bin)	■ 2.5M2	MAX DL Spectral Efficiency MAX UL Spectral Efficiency	#4SEM #4SEA	Peak and average spectral efficiency values for all MSs in a BS for both downlink and uplink directions.
	■ 3.0 ■ 3.0M ■ 3.5	Average Spectral Efficiency Max Spectral Efficiency Average Spectral Efficiency v2.5 DL Spectral Efficiency Data Zone DL Spectral Efficiency FFR Reuse 3 Zone UL Spectral Efficiency, Data Zone	#4SEA #4SEM #4SU0 #4SED #4SEF #4SEG	
Throughput (Bits per Second)	■ 2.5M2 ■ 3.0 ■ 3.0M ■ 3.5	Average Sector Throughput Average Sector Throughput FFR Reuse 3 Average Sector Throughput MIMO A/BF Average Sector Throughput MIMO B Average Sector Throughput Total Reuse 1	#4AST #4AS3 #4AS1 #4AS2 #4AS6	Throughput per BS (each measurement represents the average throughput of the passed sampling interval of 15 minutes).

Table 11-7: 4Motion BTS KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
Uplink Dropped HARQ sub-bursts (Uplink HARQ Packet Error Rate)	■ 2.5M2 ■ 3.0 ■ 3.0M	UL HARQ Packet Error Rate PER 16QAM 1/2	#4E06	Error rate of dropped packets after HARQ (Hybrid Automatic Repeated Request) of each MCS per BS for the uplink direction.
		UL HARQ Packet Error Rate PER 16QAM 3/4	#4E07	
		UL HARQ Packet Error Rate PER 64QAM 1/2	#4E08	
		UL HARQ Packet Error Rate PER 64QAM 2/3	#4E09	
		UL HARQ Packet Error Rate PER 64QAM 3/4	#4E10	
		UL HARQ Packet Error Rate PER 64QAM 5/6	#4E11	
		UL HARQ Packet Error Rate PER QPSK 1/2	#4E04	
		UL HARQ Packet Error Rate PER QPSK 1/2 Rep 2	#4E03	
		UL HARQ Packet Error Rate PER QPSK 1/2 Rep 4	#4E02	
		UL HARQ Packet Error Rate PER QPSK 1/2 Rep 6	#4E01	
		UL HARQ Packet Error Rate PER QPSK 3/4	#4E05	
		UL HARQ Packet Error Rate Total	#4E00	

11.5.5 ASN-GW KPIs

Table 11-8: 4Motion ASN-GW KPIs

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
Average Backhaul Traffic (Bits per Second)	■ 2.5M2 ■ 3.0 ■ 3.0M ■ 3.5	cntNpuBckhlPort cntNpuBearer cntNpuCascPort cntNpuExtMgmt cntNpuIntMgmt	#4NT5 #4NT1 #4NT4 #4NT2 #4NT3	Average data throughput (user IP packets) in both the downlink or uplink direction including: backhaul, bearer, external management, internal management and cascading
Authentication Reject Ratio (%)	■ 3.0 ■ 3.0M ■ 3.5	Authentication Reject Ratio Authentication Rejections	#4NTh #4NTo	Ratio of auth. Rejection in respect of successful INE
MS Registration (Count)	■ 3.0 ■ 3.0M ■ 3.5	Successful Initial NE Failed Initial NE Min Registered MSs Max Registered MSs Registered MSs Qty	#4NTm (also #4022 for BTS) #4NTn (also #4023 for BTS) #4NTj #4NTk #4NTl (also #4019 for BTS)	Number of failed/successful initial network entry attempts
MS Registration - Service Flows (Count)	■ 3.0 ■ 3.0M ■ 3.5	Created Service Flows Qty	#4NTp (also #4025 for BTS)	Number of created service flows during MS registration
NE failure Ratio (%)	■ 3.0 ■ 3.0M ■ 3.5	NE failure Ratio	#4NTg	Ratio of failed INE in respect to successful INE

Table 11-8: 4Motion ASN-GW KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
R3 CIR Throughput Oversubscription (%)	3.0	R3 CIR Throughput Oversubscription	#4NT8	Ratio is a calculation of average actual traffic rate over R3 in respect to total provisioned CIR in %
R3 MIR Throughput Oversubscription (%)	3.0	R3 MIR Throughput Oversubscription	#4NT7	Ratio is a calculation of average actual traffic rate over R3 in respect to total provisioned MIR in %
R3 Throughput (Bits per Second)	3.0	R3 Throughput	#4NT6	Average total bytes transferred over R3 with the active period to show average rate over R3
R3 Total CIR (Bits per Second)	3.0	R3 Total CIR	#4NTa	Average over 15 min period based on aggregation of CIR from all served BSs
R3 Total MIR (Bits Per Second)	3.0	R3 Total MIR	#4NT9	Average over 15 min period based on aggregation of MIR from all served BSs
R6 CIR Throughput Oversubscription (%)	3.0	R6 CIR Throughput Oversubscription	#4NTd	Ratio is a calculation of average actual traffic rate over R6 in respect to total provisioned CIR in %
R6 MIR Throughput Oversubscription (%)	3.0	R6 MIR Throughput Oversubscription	#4NTc	Ratio is a calculation of average actual traffic rate over R6 in respect to total provisioned MIR in %
R6 Throughput (Bits per Second)	3.0	R6 Throughput	#4NTb	Average total bytes transferred over R3 with the active period to show average rate over R6
R6 Total CIR (Bits per Second)	3.0	R6 Total CIR	#4NTf	Average over 15 min period based on aggregation of CIR from all served BSs

Table 11-8: 4Motion ASN-GW KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Description
R6 Total MIR (Bits per Second)	3.0	R6 Total MIR	#4NTe	Average over 15 min period based on aggregation of MIR from all served BSs
Service Flow usage Ratio	3.0	Service Flow usage Ratio	#4NTi	The number of service flows in respect to maximum allowed of 36000 service flows
Uptime	All	Uptime	#4UPT	NPU uptime

11.5.6 MS KPIs

Table 11-9: 4Motion SU KPIs

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Descripton
Aggregated Throughput (Bits per Second)	■ 3.0 ■ 3.0M ■ 3.5	Aggregated Throughput	#4SUa	Counts the bytes transferred and calculates the transferred rate normalized to the active frames MS transferred data.
■ RSSI Downlink (dBm)	■ 3.0M ■ 3.5	Downlink RSSI Avg Downlink RSSI Max Downlink RSSI Min	#4SUA #4SUC #4SUB	RSSI is sampled from each burst. Min and max are calculated by BS. Average is calculated by dividing by number of samples
■ RSSI Uplink (dBm per tone)	■ 2.5M2 ■ 3.0M ■ 3.5	Uplink RSSI Avg Uplink RSSI Max Uplink RSSI Min	#4SU9 #4SU8 #4SU7	

Table 11-9: 4Motion SU KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Descripton
■ MCS Downlink (Bit/Bin) ■ MCS Uplink (Bit/Bin) The above were changed to: Spectral Efficiency Downlink (Bit/Bin)	■ 2.5M2	MCS Min	#4SU4	Counts bit/bin for each MS transaction. Min and max are calculated by BS. Average is calculated by dividing by number of samples
		MCS Max	#4SU5	
		MCS Avg	#4SU6	
	■ 3.0 ■ 3.0M ■ 3.5	Spectral Efficiency Min	#4SU4	
		Spectral Efficiency Max	#4SU5	
		Spectral Efficiency Avg	#4SU6	
		MCS Min v2.5	#4SUn	
		MCS Max v2.5	#4SUo	
		MCS Avg v2.5	#4SUp	
		Average Spectral Efficiency v2.5	#4SU0	
	■ 3.1	MCS Avg FFR Reuse 3	#4SUm	
		MCS Max FFR Reuse 3	#4SUy	
		MCS Min FFR Reuse 3	#4SUv	
MS Burst Error Rate Ratio Downlink/Uplink (%)	■ 3.0	MS Drop Ratio	#4SUg	Ratio based on the HARQ bursts of ACK, dropped and total
	■ 3.0M	MS Successful Transfer Ratio	#4SUf	
		MS Drop Ratio	#4SUg	
		MS Retransmission Ratio	#4SUh	
MS Burst Error Rate Downlink/Uplink (Count)	■ 3.0	MS Dropped Bursts Qty	#4SUj	Counts HARQ bursts of ACK, dropped and total

Table 11-9: 4Motion SU KPIs (Continued)

KPI	Version	Measurement Name for Reports	Code for Threshold and API	Descripton
MS Burst Error Rate Downlink/Uplink (Count)	■ 3.0M	MS Successfully Transferred Bursts Qty	#4SUi	
		MS Dropped Bursts Qty	#4SUj	
		MS Retransmissions	#4SUk	
SINR Downlink/Uplink (dB)	■ 2.5M2	SINR Avg	#4SU3	Signal to Noise Ratio average (in dB) per the number of sampled bursts
	■ 3.0 ■ 3.0M ■ 3.5	SINR Avg	#4SU3	
		SINR Avg FFR Reuse 3	#4SUl	
		SINR Avg MIMO B	#4SUs	
		SINR Max	#4SU2	
		SINR Max FFR Reuse 3	#4SUr	
		SINR Max MIMO B	#4SUu	
		SINR Min	#4SU1	
		SINR Min FFR Reuse 3	#4SUq	
		SINR Min MIMO B	#4SUt	
Throughput Ratio (%)	■ 3.0 ■ 3.0M ■ 3.5	MS MIMO A Ratio	#4SUc	
		MS MIMO B Ratio	#4SUd	
		MS BF Ratio	#4SUe	
Total Transferred Bursts	■ 3.0	Total Transferred Bursts	#4SUb	

11.5.7 BreezeMAX Extreme

11.5.8 Overview

- SW Compatibility - version 1.5
- Collector type - WiMAX Extreme
- Multi-version support is not implemented for Extreme. Therefore, there might be some empty graphs if the running version is 1.5, since some of the KPIs are only applicable in ver.1.7/1.8.

11.5.9 Network Discovery Prerequisites

Optional - registered as Authorized manager with traps disabled - according to BreezeMAX Extreme specifications.

11.5.10 Extreme BTS KPIs

Table 11-10: Extreme BTS KPIs

KPI	Measurement Name	Code for Threshold and API	Description
Air Link Free Ratio (%)	Air Link Free Ratio	#eBSl	Air-link free unused (i.e. potential) ratio in % in DL/UL direction during measured period (100% = DL/UL Occupation ratio).
Air Link Occupation Ratio (%)	Air Link Occupation Ratio	#eBSk	Air-link occupation ratio in % in DL/UL direction during the measured period
CIR Allocated (Bits per Second)	CIR Allocated	#eBSe	Aggregation of maximum provisioned traffic of CIR services during the sampled 15 minutes period.
CIR Related Over-Subscription Ratio (%)	CIR related Over Subscription Ratio	#eBSg	Calculation of average actual traffic in respect to total provisioned CIR in %

Table 11-10: Extreme BTS KPIs (Continued)

KPI	Measurement Name	Code for Threshold and API	Description
Drop Ratio (%)	Drop Ratio	#eBSb	Ratio between number of dropped bursts and total bursts (dropped and succeeded) counted in the sampled period
MIR Allocated (Bits per Second)	MIR Allocated	#eBSf	Aggregation of maximum provisioned traffic of MIR services during the 15 minutes period.
MIR Related Over-Subscription Ratio (%)	MIR related Over Subscription Ratio	#eBSh	Calculation of average actual traffic in relation to total provisioned MIR in %
Number of Connected SU (Count)	Number Of Connected SUs	#eCS	Number of SUs that have been connected to the BS, for the whole 15 minute interval proceeding the PMTM file generation.
Repetition Ratio (%)	Repetition Ratio	#eBSc	Ratio between aggregated CPE HARQ repetitions to aggregated Total Bursts
	Seen	#eSEE	
Throughput (Bits per Second)	Throughput	#eT	Average sector throughput per BS (each measurement represents the average throughput of the passed sampling interval of 15 minutes).
Total Available Slots	Total Available Slots	#eBSi	Total number of applicable slots in air-link frames during the measured period
Transfer Ratio (%)	Transfer Ratio	#eBSa	Ratio between aggregated CPE Total Bursts to aggregated CPE Total and Dropped Bursts.
Transfer Overhead (%)	Transfer overhead	#eBSd	Ratio between aggregated CPE HARQ NACKs to aggregated CPE HARQ ACKs
Uptime	Uptime	#eUPT	Time since last system boot in hours

Table 11-10: Extreme BTS KPIs (Continued)

KPI	Measurement Name	Code for Threshold and API	Description
Used Slots	Used Slots	#eBSj	Total number of used slots in air-link frames during the measured period

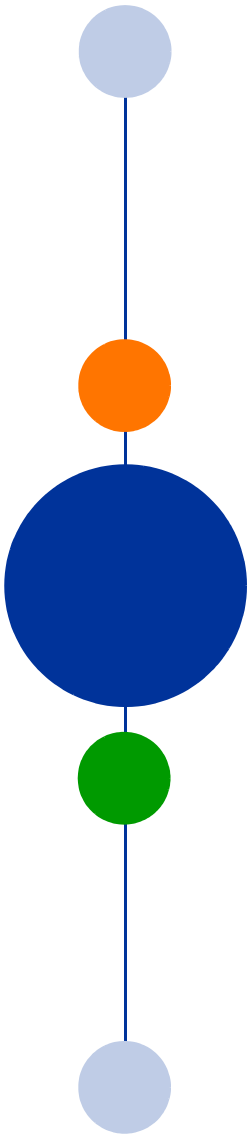
11.5.11 Extreme MS KPIs

Table 11-11: Extreme SU KPIs

KPI	Measurement Name	Code for Threshold and API	Descripton
SU CIR Allocated (Bits per Second)	SU CIR Allocated	#eSUe	Aggregation of maximum provisioned traffic of CIR services for each CPE during the 15 minutes period.
Su Drop Ratio (%)	SU Drop Ratio	#eSUb	Ratio between number of dropped bursts and total bursts (dropped and succeeded) for each CPE, counted in the sampled period
SU MIR Allocated (Bits per Second)	SU MIR Allocated	#eSUf	Aggregation of maximum provisioned traffic of MIR services for each CPE during the 15 minutes period.
Rate Downlink/Uplink (Rate)	SU RATE AVERAGE SU RATE MAX SU RATE MIN	#eSU9 #eSU8 #eSU7	Modulation Rate for each MS. The Min and max Rate sampled in the integration period of 15min. Average is calculated by dividing by number of samples
RSSI Downlink/Uplink (dBm)	SU RSSI AVERAGE SU RSSI MAX SU RSSI MIN	#eSU6 #eSU5 #eSU4	RSSI is sampled from each burst. Min and max RSSI value sampled in the integration period of 15min. Average is calculated by dividing by number of samples
SU Repetition Ratio (%)	SU Repetition Ratio	#eSUc	Ratio between CPE HARQ repetitions to Total Bursts

Table 11-11: Extreme SU KPIs (Continued)

KPI	Measurement Name	Code for Threshold and API	Descripton
SNR Downlink/Uplink (dB)	SU SNR AVERAGE SU SNR MAX SU SNR MIN	#eSU3 #eSU2 #eSU1	SNR Min and max SNR value sampled in the integration period of 15min. Average is calculated by dividing by number of samples
SU Throughput (Bits per Second)	SU Throughput	#eSUg	Counts the bytes transferred and calculates the transferred rate normalized to the active frames MS transferred the counted bytes.
SU Transfer Ratio (%)	SU Transfer Ratio	#eSUa	Ratio between CPE Total BURSTS to CPE Total BURSTS and CPE Dropped Bursts
SU Transfer Overhead (%)	SU Transfer overhead	#eSUd	Ratio between CPE HARQ NACKs and CPE HARQ ACKs



Glossary

The following terms are frequently used in this manual:

API	Application Program Interface - interface which enables an application program to communicate with the operating system and other services provided by the operating system
AU	Access Unit
BS	Base Station
BTS	Base Transceiver Station
CIR	Committed Information Rate
CINR	Carrier to Interference-plus-Noise Ratio
CPE	Customer Premises Equipment
Equipment	the basic sampled unit. Two types of equipment are used in the StarQuality system: ■ **AU** /Slot/ BS/Sector (in TDD or FDD only) ■ **SU/CPE/MS**
HARQ	Hybrid Automatic Repeated Request
MCS	Modulation Coding Scheme
MIR	Maximum Information Rate
MS	Mobile Subscriber
NBI	Northbound Interface
NE	Network Element
Public/Private objects	Public objects (sites, etc.) are created by the admin user for the whole system. Private object are created by the local user for the local system only.
ROOT Site	the basic system network site, under which you can create sites and virtual sites
RSSI	Received Signal Strength Indication.
SINR	Signal Interference Noise Ratio
SNR	Signal to Noise Ratio
SOAP	Simple Object Access Protocol - An interface to enable various NBI operations via third party applications
Site	■ **Non-virtual** - A base station, containing up to 7 AUs, on which measurements are collected ■ **Virtual Site** - any collection of equipments, grouped by various subjects, such as areas

SU	Subscriber Unit
XLS	Excel file format